Annotated Bibliography of Rocky Mountain Bighorn Sheep Specific to the Management of Bighorn Sheep in Kootenay National Park

Edited by
David M. Poll and John G. Stelfox

Compiled by
Stephanie Ibach

CANADIAN WILDLIFE SERVICE

Annotated Bibliography of Rocky Mountain Bighorn Sheep specific to the Management of Bighorn Sheep in Kootenay National Park

Edited by

David M. Poll and John G. Stelfox

Compiled by

Stephanie Ibach

Produced by

Canadian Wildlife Service, Edmonton

for

Parks Canada, Western Region

March, 1985

CONTENTS

INTRODUCTION 1
BEHAVIOUR - GENERAL (BE1) 2
Seasonal Distribution and Migration (BE2) 9
Habitat Selection and Utilization (BE3) 25
BIBLIOGRAPHIES AND WORKSHOP PROCEEDINGS (BW) 36
DISEASES AND PARASITES (DP1) 40
Pneumonia-Lungworm (DP2) 56
MANAGEMENT - GENERAL (MA1) 80
Range Management (MA2) 92
Population Management (MA3) 97
Resource Development Conflicts (MA4) 102
MORTALITY FACTORS (MF1) 106
Highway and Railway Mortality (MF2) 112
Predation (MF3) 112
Hunting (MF4) 116
NUTRITION (NP1) 120
Food Habits (NP2) 121
PHYSIOLOGY (NP3) 131
Bioenergetics (NP4) 131
POPULATION DYNAMICS (PD1) 133
Die-offs and Recoveries (PD2) 142
Health and Condition (PD3) 148
Reproduction and Growth (PD4) 152
Historic Populations (PD5) 159
HABITAT-GENERAL (RA1) 166
Range Condition and Trend (RA2) 171
Range Production, Utilization and Quality (RA3) 177
Competition and Overlap (RA4) 182
Critical and Seasonal Ranges (RA5) 190
Floral Phenology and Climate (RA6) 195
RESEARCH TECHNIQUES (RT1) 204
Statistical Methods (RT3) 204
Range Analysis (RT4) 204
Disease and Parasites (RT5)

INTRODUCTION

This bibliography was prepared for Parks Canada as a result of a literature review conducted for the study of bighorn sheep in Kootenay National Park. The compilation was selective, being specific to literature on Rocky Mountain bighorn sheep *(Ovis canadensis canadensis* Shaw) with primary emphasis on literature relevant to Kootenay National Park. Citations were categorized into one of three "Areas" according to its relevance to the park: Area A, East Kootenay Region of southeastern British Columbia; Area B, Canadian Rocky Mountains; and Area C, northwestern U.S.A. and other relevant areas.

Literature was accessed from numerous sources including university and government departmental libraries, computer data bases and other published bibliographies and workshop proceedings (see Appendix I for listing of source locations). References were annotated, categorized by relevant subject area and compiled onto magnetic disc at University of Alberta Computing Services.

On-line searching capability was achieved through the use of the SPIRES (Stanford Public Information Retrieval System) data base management system at the University of Alberta. This system provides an efficient and versatile storage, retrieval and indexing facility which is easily used and can be continually updated. Appendix II gives instructions for accessing the sheep bibliography ('SHEEP.BIB') subfile through *SPIRES at the University of Alberta Computing Services.

This report, which groups references alphabetically by subject, was produced through *SPIRES and the *TEXTFORM text processing and editing system also supported by the University of Alberta.

Numerous individuals and institutions provided assistance in accessing material for this bibliography. Special thanks are due the following for their assistance:

Bill Wishart - Alberta Fish & Wildlife, Edmonton
Dr. Robert Hudson - Dept. Animal Science, U of Alberta
Dr. Wm. Samuel - Dept. Zoology, U of Alberta
Lorne Russell - Alberta Fish & Wildlife, Lethbridge
Dr. Barbara Kingscote - Animal Disease Research Institute, Lethbridge
Dr. Walter Willms - Agriculture Canada Research Station, Lethbridge
Ray Demarchi - B.C. Fish & Wildlife, Cranbrook
Dennis Demarchi - B.C. Fish & Wildlife, Victoria
Peter Jordan - Canadian Wildlife Service Library, Edmonton

Thanks are also due Chief Warden Peter Whyte and Warden Brian Sheehan of Kootenay National Park and Patricia Benson, Parks Canada, Western Region, Calgary for their support of and assistance with this project.

Finally, we acknowledge with great appreciation the contributions of Janet Makarenko, SPIRES Consultant, University of Alberta, who provided much needed expertise in the development of this data base.

BEHAVIOUR - GENERAL (BE1)

SH0013

Banfield, A.W.F. 1974.
The mammals of Canada. (pp. 413-416).
The Univ. of Toronto Press. Toronto, Canada.

Gives status and distribution of bighorn sheep in North America and Canada as well as a discussion of morphology, habits, habitat, reproduction, and taxonomy plus references.
Subject: RA1 BE1 PD3 Area: C Source: KPNL CWSE UOAL

SH0020

Berger, J. 1980.
The ecology, structure and functions of social play in bighorn sheep (Ovis canadensis).
J. Zoology, London. 192:531-542.

Relates differing social play behavior to differing habitat for California and Rocky Mountain bighorn sheep, and Stone and Dall sheep.
Subject: PD1 BE1 BE3 Area: C Source: UOAL

SH0022

Bibaud, A. and A. Dialman. 1980.
Region 4 sheep survey.
Alberta Energy and Natural Resources. Edmonton, Alberta.

An aerial survey of 14 designated winter ranges was flown in the Edson region between Jan. 7-17, 1980. The objective of the survey was to locate, count and classify bighorn sheep herds on designated winter ranges. The results were compared to those of 1978.
Subject: BE1 BE2 PD1 Area: B Source: AFWE

SH0034

Buechner, H.K. 1960.
The bighorn sheep in the United States, its past, present and future.
Wildl. Monographs, No. 4. A publication of The Wildl. Society

A study of Rocky Mountain bighorn sheep (as well as other sheep species) in the United States. Discusses distribution, abundance, natality, mortality, natural regulation of numbers, and relationships to vegetation and other ungulates,
Subject: BE1 PD1 MF1 RA4 Area: B Source: CWSE

SH0051

Cowan, I.McT. 1940.
Distribution and variation in the native sheep of North America.

Describes the history, distribution, physical characteristics, and variations within

the genus Ovis. Physical and geographic locations and the numbers of wild sheep in North America are outlined.
Subject: PD1 BE1 BE2 Area: B Source: AFWE

SH0055

Crawford, J.S. 1967.
Duel in the Rockies.
Outdoor Life. October 1967:54 ff.

Illustrates dueling between Rocky Mountain bighorn rams. Gives insight into rutting behaviour.
Subject: BE1 Area: C Source: CWSE

SH0479

Demarchi, R.A. and D.A. Demarchi. 1967.
Status of the Rocky Mountain bighorn.
Wildl. Rev. 4(4):10-14.
Subject: PD2 PD3 BE1 Area: B Source: UOAL

SH0401

Downing, S.C. 1950.
The Rocky Mountain bighorn.
Can. Nature 12(4):140-141.

Discussed habits, worldwide distribution, and physical characteristics of Rocky Mountain bighorn sheep in Canada and the U.S.
Subject: PD1 BE1 Area: A Source: ANNB

SH0100

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in the Rocky Mountain House area of the Eastern Slopes region.
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

The main objectives of this survey were to obtain a count and classification of all observable sheep within each delineated winter range complex. This data was then used to : (1) supplement trend data (density, distribution and composition), (2) predict harvestable rams, (3) allot non-trophy sheep permits, and (4) manage the species.
Subject: PD1 BE1 BE2 MA1 Area: B Source: AFWE

SH0099

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in Region 3 (Dec. to Jan., 1979-80).
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents results of an aerial sheep survey of fourteen known wintering areas of bighorn sheep in the Red Deer region, Alberta. Survey counts and classifies all observed sheep and then estimates population and harvestable rams based on herd size, composition and distribution of the classified sheep. This information can be used to develop management techniques in the area.
Subject: BE1 BE2 PD1 MA1 Area: B Source: AFWE

SH0104

Geist, V. 1967.
A consequence of togetherness.
Natur. Hist. 76(8):24-31.

Discusses the inability of the North American mountain sheep to disperse into new habitat. Suggests that this problem of reintroduction stems from the inheritance of social traditions of the sheep.
Subject: BE1 MA1 Area: A Source: KPWL

SH0107

Geist, V. 1968.
On the interactions of external appearance, social behavior and social structure of mountain sheep.
The Univ. of B.C. Vancouver, British Columbia.

Investigates animal behavior in relation to physiology and anatomy. Various species of mountain sheep are described and there are various locations of study (including Rocky Mountain bighorn sheep in Banff National Park).
Subject: BE1 PD4 Area: B Source: CWSE

SH0481

Geist, V. 1971.
Mountain sheep : a study in behavior and evolution.
Univ. of Chicago Press. Chicago.
Subject: BE1 PD5 Area: B Source: CWSE

SH0105

Geist, V. 1967.
On the behavior and evolution of American sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

Documents the results of behavior studies of Stone, Dall and Rocky Mountain bighorn sheep. Discusses the evolution of sheep in detail. Found that the primary evolutionary changes took place in social adaptations.
Subject: BE1 BE2 PD5 Area: B Source: ANNB

SH0108

Geist, V. 1968.
On delayed social and physical maturation in mountain sheep.
Can. J. Zool. 46:899-904.

Gives detailed descriptions of parameters of maturation for native North American sheep. These parameters include social as well as physical characteristics. Also discusses delayed maturation in light of these characteristics.
Subject: PD4 BE1 Area: C Source: UOAL

SH0106

Geist, V. 1967.
Report on the investigations conducted into the behavior of bighorn sheep in Banff National Park in November and December, 1966.

Detailed account of the behavior, movements, and distributions of Rocky Mountain bighorn sheep in Banff National Park. There is some discussion

regarding the tagging of sheep.
Subject: BE1 BE2 RA5 RT7 Area: B Source: CWSE

SH0109

Geist, V. 1971.
A behavioral approach to the management of wild ungulates.
11'th Symp. of the Brit. Ecol. Soc., The Univ. of East Anglia, Norwich. July 7-9, 1970.

Describes how wild ungulates (including bighorn sheep in Alberta and B.C.) cope with man's activities and disturbances on their natural habitat. Various physical changes are described as being a result of harrassment. and a change of range utilization is discussed. Wildlife management objectives are outlined, in light of the discussion.
Subject: RA3 BE1 BE2 MA4 Area: C Source: AFWE

SH0117

Green, H.U. 1949.
The bighorn sheep of Banff National Park.
Dept. Services Branch, National Parks and Historic Sites Service. Ottawa, Canada.

A general description of bighorn sheep at Banff National Park. Topics include range description, diseases and parasites, population, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: B Source: CWSE

SH0128

Hebert, D.M. 1976.
Intensive sheep production product, Okanagan Game Farm (preliminary outline).
B.C. Fish and Wildl. Branch. Nanaimo, British Columbia.

Contains various papers dealing with bighorn sheep production on the Okanagan Game Farm, British Columbia. Outlines the research program to be conducted on the farm, and includes various techniques and theoretical considerations.
Subject: PD3 MA1 BE1 RT4 Area: B Source: CWSE

ID = SH0140

Horejsi, B. 1976.
Some thoughts and observations of harrassment and bighorn sheep.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:149-155

Discusses man's activities on sheep range and harrassment (active and passive) of mountain sheep in Alberta. Includes a description of animal behavior and reaction to this harrassment, and relates this to management objectives.
Subject: MA4 BE1 Area: B Source: AFWE

SH0139

Horejsi, B. 1972.
Behavioral differences in bighorn lambs (Ovis canadensis canadensis Shaw) during years of high and low survival.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972:51-73.

Relates behavioral differences in Rocky Mountain bighorn lambs to the expansion (or declination) of the population. The study area was the Sheep River area of southwest Alberta.
Subject: BE1 BE2 PD2 PD4 Area: B Source: KPNL

SH0141

Hornocker, M.G. 1969.
Defensive behavior in female bighorn sheep.
J. Mammal. 50(1):128.

Describes an incident of female bighorn sheep defending a lamb from a bobcat in Idaho.
Subject: BE1 MF3 Area: B Source: UOAL

SH0196

McCann, L.J. 1953.
Ecology of the mountain sheep.
PhD. Thesis, Univ. of Utah. Salt Lake City, Utah.

The zoogeography, distribution, range conditions, diseases, competition, and social interactions of the genus Ovis in the United States are dicussed.
Subject: RA1 BE1 BE2 DP1 Area: B Source: ANNB

SH0200

McLean. 1973.
Ram Mountain study.
Dept. Lands and Forests, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Determines the limiting factors tending to stabilize the Ram Mountain sheep population. Documents trapping activities, mortality of marked sheep, inventory, general behavior, seasonal movements and distributions, and forage samples.
Subject: RA5 BE1 BE2 BE3 Area: B Source: AFWE

SH0213

Neff, D.J. 1968.
The pellet-group count technique for big game trend, census and distribution : a review.
J. Wildl. Manage. 32(3):597-614.

Discusses the method of pellet-group count as a determinant of population dynamics, range use and distributions of big game.
Subject: RT6 BE1 BE2 BE3 Area: C Source: CWSE

SH0215

Petocz, R.G. 1973.
The effect of snow cover on the social behavior of bighorn rams and mountain goats.
Can. J. Zool. 51:987-993.

Documents the effect of snow cover on the behavior of Rocky Mountain bighorn rams during the rutting season. The study was conducted on the Palliser Range, Banff National Park, Alberta.
Subject: RA5 PD5 BE1 Area: B Source: CWSE

SH0231

Risenhoover, K.L. and J.A. Bailey. 1980.
Visibility : an important habitat factor for an indigenous, low-elevation bighorn herd in Colorado.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:18-28.

Presents data on behavioral responses of bighorns to variations in vegetation density and consequent variation in visibility. The sheep are Rocky Mountain bighorns in Waterton Canyon, Colorado. Also discusses the importance of visibility to success of predator-evasion strategy of the sheep, and management implications of visibility in sheep habitats.
Subject: BE1 BE3 Area: B Source: AFWE

SH0474

Rush, W.M. 1942.
Wild animals of the Rockies.
Harper Brothers. New York.

Gives a general description of bighorn sheep in the Rocky Mountains. Topics include disease, range condition as affecting the health of the animals, some behavior, and the activities of man affecting the herds.
Subject: DP2 RA2 BE1 Area: B Source: ANNB

SH0496

Schmidt, J.L. and eds. D.L. Gilbert 1980.
Big game of North America, ecology and management.
Stackpole Books. Harrisburg, Pennsylvania.

A good reference on the ecology and management of the big game of North America. Includes short articles on various animals, and concludes with a series of reports dealing specifically with habitat, and management problems.
Subject: BE1 PD1 RA1 MA1 Area: B Source: AFWL

SH0246

Shackleton, D. 1969.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Research proposal for the Univ. of Calgary. Calgary, Alberta.

Outlines techniques and hypotheses upon which the investigation on the population of bighorn sheep will be based. Areas of study include Banff and Waterton National Parks.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0247

Shackleton, D.M. 1970.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Progress Report for The Univ. of Calgary. Calgary, Alberta.

Looks at population quality and some behavioral aspects of Rocky Mountain bighorn sheep in Banff and Waterton National Parks, as well as two areas in Montana. Skeletal analysis is one of the main techniqus used and discussed.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0249

Shackleton, D.M. and D.A. Hutton. 1971.
An analysis of the mechanisms of brooming of mountain sheep horns.
Univ. of Calgary. Calgary, Alberta.

Discusses the behavioral causes of broomed horns in bighorn sheep.
Subject: PD4 BE1 Area: C Source: CWSE KPNL

SH0261

Smith, I. and R. Demarchi. 1969.
Mountain sheep in British Columbia.
B.C. Fish and Wildl. Branch. Victoria, British Columbia.

A general description of mountain sheep in the Rocky Mountains of British Columbia. Topics include habitat, population distributions, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: A Source: KPWL

SH0269

Stelfox, J.G. 1964.
Bighorn ecological study in the Coalbranch Region (Drummond Creek south to Ruby Creek).
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents range conditions, distribution and population of bighorn sheep and elk herds in the Drummond-Ruby Creek region of the Coalbranch, in order that some effective management proposals could be outlined.
Subject: PD1 BE1 BE2 MA1 Area: B Source: CWSE

SH0336

Wishart, W.D. 1966.
Bighorn population and harvest study.
Wildl. Investigations Report, Alta. Fish and Wildl. Edmonton, Alberta.

Documents the sex and age structure, population numbers of bighorn sheep, and the location of 19 winter ranges in Alberta. This information is then related to the present harvest methods.
Subject: PD1 BE1 BE2 MA4 Area: B Source: AFWE

SH0343

Wishart, W.D. 1980.
Bighorn sheep. In Big game of North America, ecology and management. pp 161-171. J.L. Schmidt and D.L. Gilbert, eds.
Stackpole Books. Harrisburg, Pennsylvania.

Discusses the general physical description, population dynamics, food habits, diseases and parasites, competition, predation and various management consideraions (harvesting, populations and habitat) of the four species of bighorn sheep inhabiting North America.
Subject: PD1 DP1 BE1 MF1 Area: B Source: AFWE

SH0355

Woolf, A., T. O'Shea and D.L. Gilbert. 1970.
Movements and behavior of bighorn sheep on summer ranges in Yellowstone National Park.
J. Wildl. Manage. 34(2):446-450.

Herd behavior and movements of bighorn sheep in Yellowstone National Park during the summers of 1966 and 1967 are discussed.
Subject: BE1 BE2 Area: B Source: CWSE

SEASONAL DISTRIBUTION AND MIGRATION (BE2)

SH0397

Banfield, A.W.F. 1947.
The mammals of Waterton Lakes National Park, 1947.
Can. Wildl. Serv. Wildl. Manage. Bull. Series 1, No. 1. p. 11.

Documents die-offs due to pneumonia, sex and age ratios, condition and distribution, and food habits of bighorn sheep in Waterton Lakes National Park.
Subject: DP1 BE2 NP2 Area: B Source: CWSE ANNB

SH0017

Becker, K., T. Varcalli E.T. Thorne and G.B. Butler. 1978.
Seasonal distribution patterns of Whiskey Mountain bighorn sheep.
Proc. North. Wild Sheep and Goat Conf., Penticton, B.C. April 2-4, 1978:1-16.

Documents the seasonal distribution and migration routes of bighorn sheep (Ovis c. canadensis) on Wyoming's Whiskey Mountain.
Subject: BE2 Area: B Source: AFWE

SH0022

Bibaud, A. and A. Dialman. 1980.
Region 4 sheep survey.
Alberta Energy and Natural Resources. Edmonton, Alberta.

An aerial survey of 14 designated winter ranges was flown in the Edson region between Jan. 7-17, 1980. The objective of the survey was to locate, count and classify bighorn sheep herds on designated winter ranges. The results were compared to those of 1978.
Subject: BE1 BE2 PD1 Area: B Source: AFWE

SH0491

Brady, K.S. 1975.
A report on wildlife numbers and distribution. Period covered : Jan. 1974 -Feb. 1975 - Waterton Lakes National Park.
Compiled for Waterton Lakes Nat. Park Warden Service.

Documents the results of a wildlife census and distibution survey conducted in Waterton Lakes National Park during the period from Jan. 1974 to Feb. 1975. Results are included in both discussion and table form. Methodology is given some discussion.
Subject: BE2 PD1 RT6 Area: B Source: AFWL

SH0490

Brady, K.S. D = 1973
Ungulate abundance and distribution, Waterton Lakes National Park.
Compiled for Waterton Lakes Nat. Park Warden Service.

This is a report on the abundance and distribution of ungulates in Waterton Lakes National Park covering the period from March, 1971 to November, 1973, inclusive....A total of six ungulate species are dealt with in the report under subheadings in regard to status, distribution and habitat preference, followed by general remarks.
Subject: BE2 BE3 PD1 Area: B Source: AFWL

SH0032

Brown, G.W. 1974.
Distribution and population characteristics of bighorn sheep near Thompson Falls in northwestern Montana.
MSc. Thesis, The Univ. of Montana. Missoula, Montana.

Outlines distribution, population dynamics, general behavior and diseases of bighorn sheep near Thompson Falls, northwestern Montana. Included are research techniques used in obtaining the data.
Subject: RT6 BE2 NP2 DP2 Area: B Source: CWSE

SH0046

Cook, A.R. 1982.
Aerial bighorn sheep census of designated winter ranges within the Edson District of the East Slopes region.
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents results of a bighorn sheep survey of designated winter ranges within the Edson district of the East Slopes region. Uses the expanded range concept as outlined by Cook and Hall (1977).
Subject: RT6 BE2 Area: B Source: AFWE

SH0492

Couey, F.M. 1950.
Rocky Mountain bighorn sheep of Montana.
Project 1-R, Montana Fish and Game Comm.

Complete description of the Sun River bighorn herd in Montana. Topics include history, distributions, range analysis, general behavior, predator relationships, and trapping and transplanting. A bibliography is included at the conclusion of the report.
Subject: BE2 PD5 RA1 MF3 Area: B Source: WNPL

SH0470

Couey, F.M. et al. 1952.
Wildlife surveys and management.
F.A. Montana Project No. W-1-R. Helena, Montana.

Discusses the history, present distribution, populations, range use, moratality factors and management of the Sun River bighorn sheep herd in Montana.
Subject: PD1 BE2 MA3 MF1 Area: B Source: ANNB

SH0051

Cowan, I.McT. 1940.
Distribution and variation in the native sheep of North America.

Describes the history, distribution, physical characteristics, and variations within the genus Ovis. Physical and geographic locations and the numbers of wild sheep in North America are outlined.
Subject: PD1 BE1 BE2 Area: B Source: AFWE

SH0059

Davis, W.B. and W.P. Taylor. 1939.
The bighorn sheep of Texas.
J. Mammal. 20:440-455.

Outlines geography, distribution, habits, etc. for bighorn sheep in Texas. Reasons for the small population were given as overhunting, eagle predation, competition and the initial small number.
Subject: RA1 PD1 BE2 Area: B Source: UOAL

SH0083

Festa-Bianchet, M. 1983.
Report on a bighorn sheep - lungworm study at Sheep River, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

A detailed study of Rocky Mountain bighorn sheep at Sheep River, Alberta. Documents population dynamics, behavior and lungworm infection of this band.
Subject: PD2 DP2 RT6 BE2 Area: B Source: CWSE

SH0100

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in the Rocky Mountain House area of the Eastern Slopes region.
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

The main objectives of this survey were to obtain a count and classification of all observable sheep within each delineated winter range complex. This data was then used to : (1) supplement trend data (density, distribution and composition), (2) predict harvestable rams, (3) allot non-trophy sheep permits, and (4) manage the species.
Subject: PD1 BE1 BE2 MA1 Area: B Source: AFWE

SH0099

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in Region 3 (Dec. to Jan., 1979-80).
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents results of an aerial sheep survey of fourteen known wintering areas of bighorn sheep in the Red Deer region, Alberta. Survey counts and classifies all observed sheep and then estimates population and harvestable rams based on herd size, composition and distribution of the classified sheep. This information can be used to develop management techniques in the area.
Subject: BE1 BE2 PD1 MA1 Area: B Source: AFWE

SH0402

Gaufin, D.M. and G. Ellis. 1941.
Mountain sheep survey.
Idaho Project No. R-7. Idaho Dept. Fish and Game. Boise, Idaho.

Describes the distribution of mountain sheep in Idaho, and the competition among species.
Subject: BE2 Area: B Source: ANNB

SH0106

Geist, V. 1967.
Report on the investigations conducted into the behavior of bighorn sheep in Banff National Park in November and December, 1966.

Detailed account of the behavior, movements, and distributions of Rocky Mountain bighorn sheep in Banff National Park. There is some discussion regarding the tagging of sheep.
Subject: BE1 BE2 RA5 RT7 Area: B Source: CWSE

SH0109

Geist, V. 1971.
A behavioral approach to the management of wild ungulates.
11'th Symp. of the Brit. Ecol. Soc., The Univ. of East Anglia, Norwich. July 7-9, 1970.

Describes how wild ungulates (including bighorn sheep in Alberta and B.C.) cope with man's activities and disturbances on their natural habitat. Various physical changes are described as being a result of harrassment. and a change of range utilization is discussed. Wildlife management objectives are outlined, in light of the discussion.
Subject: RA3 BE1 BE2 MA4 Area: C Source: AFWE

SH0105

Geist, V. 1967.
On the behavior and evolution of American sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

Documents the results of behavior studies of Stone, Dall and Rocky Mountain bighorn sheep. Discusses the evolution of sheep in detail. Found that the primary evolutionary changes took place in social adaptations.
Subject: BE1 BE2 PD5 Area: B Source: ANNB

SH0111

Geist, V. 1972.
On the significance of thermoclines to the biology of wintering mountain sheep.
North. Wild Sheep Counc. Symp., Hinton, Alberta. April 11-13, 1972: 75-76.

Investigates the question of why mountain sheep frequent high elevations during mid-winter.
Subject: RA5 BE2 PD5 Area: A Source: KPNL

SH0115

Geist, V. and R.G. Petocz. 1977.
Bighorn sheep in winter : Do rams maximize reproductive fitness by spatial and habitat segregation from ewes?
Can. J. Zool. 55(11):1802-1810.

Discusses the seasonal distributions of rams and ewes (Rocky Mountain bighorn sheep) on the Palliser Range of Banff National Park. Investigates the seperation of ewes and rams during the winter with respect to vegetation, climate and competition between male and female. The geography of the range is also taken into consideration.
Subject: BE2 BE3 BE5 PD4 Area: B Source: CWSE

SH0114

Geist, V. and R.G. Petocz.
On the temporal and spatial occupation patterns of a wintering area by bighorn sheep and their theoretical implications.
The Univ. of Calgary. Calgary, Alberta.

Investigates whether sheep populations have a predictable pattern of home range occupation in time and space. Discusses spatial distributions as being affected by preference for cliff terrain, winter conditions and food habits. Some management considerations are discussed. The study area is the Palliser Range in Banff National Park, Alberta.
Subject: BE2 BE3 PD5 Area: B Source: AFWE

SH0451

Grinnell, G.B. 1928.
Mountain sheep.
J. Mammal. 9(1):1-9.

Gives the historical eastern ranges of mountain sheep. Includes a description of habits and behavior.
Subject: BE2 Area: B Source: ANNB UOAL

SH0121

Hall, B. and A. Bibaud. 1975.
1974-75 Region 4 sheep survey.
Wildl. Serv. Surveys Section Project W-4-75, Alta. Fish and Wildl. Edmonton, Alberta.

Documents results of an aerial survey conducted in the winter of 1974 to 1975 for Rocky Mountain bighorn sheep in Region 4 (Edson Distr.), westcentral Alberta. 1,133 sheep were sighted during the survey, as well as various other ungulates.
Subject: BE2 Area: B Source: AFWE

SH0119

Hall, B., A. Bibaud and A. Cook. 1973.
Willmore Wilderness Park summer goat and sheep survey.
Wildl. Inventory Project W-4-73, Alta. Fish and Wildl. Edmonton, Alberta.

Documents the number of goats and bighorn sheep sighted in the Willmore Wilderness Park between July 7 and Aug. 23, 1973.
Subject: BE2 Area: B Source: AFWE

SH0120

Hall, B., A. Bibaud and A. Cook. 1974.
Willmore Wilderness Park summer sheep and goat survey.
Wildl. Inventory Project W-4-74, Alta. Fish and Game. Edmonton, Alberta.

Documents the distribution of goats and bighorn sheep sighted in Willmore Wilderness Park on June 27 and July 4, 1974.
Subject: BE2 Area: B Source: AFWE

SH0404

Harris, J.T. 1956.
Survey of the Poudre River bighorn herd.
Colorado Coop. Wildl. Res. Unit, Quarterly Report 10(2):25-33.

Discusses location of seasonal and critical ranges, physical description and condition and some mortality factors of bighorn sheep of the Poudre River Herd, Colorado.
Subject: BE2 MF1 Area: B Source: ANNB

SH0126

Hebert, D.M. 1973.
Altitudinal migration as a factor in the nutrition of bighorn sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

A documented account detailing the nutrition of Rocky Mountain bighorn sheep in an area centered in the Rocky Mountain Trench between Elko and Premier Ridge. Outlines diet in various areas, including an analysis of nutrients. The results include research techniques employed while studying animal trials and simulated altitudinal migration, as well as the outcome of these experiments on the sheep. The paper is very specific on details regarding the subject matter.
Subject: BE2 BE3 RT9 NP1 Area: A Source: UBCL

SH0133

Hickey, W.O. 1977.
Bighorn sheep ecology.
Idaho Dept. of Fish and Game, Project W160R4. Salmon, Idaho.

The report is broken down into four main areas of study : (1) classification of ranges by vegetation habitat type, and definition of food habits, (2) movements, migrations, population dynamics of selected bighorn populations, (3) re-introduction as a management technique, and (4) evaluation of bighorn sheep hunting. The studies were conducted at various locations throughout Idaho.
Subject: BE2 NP2 MA3 MF4 Area: B Source: CWSE

SH0132

Hickey, W.O. 1973.
Bighorn sheep ecology, job progress report.
Idaho Fish and Game Dept. Salmon, Idaho.

A report on vegetation, habitat, seasonal movements and distributions, and population dynamics of bighorn sheep in Idaho.
Subject: BE2 BE3 NP2 PD1 Area: B Source: CWSE

SH0134

Hoffman, W.H. 1971.
The limiting factors controlling the Ram Mountain bighorn sheep herd.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Presents details of the limiting factors regulating bighorn sheep numbers which directly and indirectly affect the differential survival of the various age groups within the population. Outlines the ecology and climate of the range, sheep population, natality and seasonal distributions, and gives detailed techiques.
Subject: RA1 PD1 BE2 Area: B Source: AFWE

SH0494

Holsworth, W.N. 1957.
Report on the status of the Rocky Mountain bighorn sheep of Waterton Lakes National Park, Alberta and annotated list of the birds and mammals of Waterton Park.
Can. Wildl. Serv. Edmonton, Alberta.

The aims of the investigation were to trap and mark adult sheep so that they could be followed individually from their winter range on to their summer range, and to determine the time and place of lambing of the largest band of bighorn sheep in Waterton Lakes Park, the Pass Creek Band.
Subject: BE2 RA5 Area: B Source: WNPL

SH0138

Honess, R.F. and N.M. Frost. 1942.
A Wyoming bighorn sheep study.
Wyoming Fish and Game Dept. Bulletin #1.

Studied population size and distributions of bighorn sheep in Wyoming. Decimation factors were considered. Some suggested factors were insufficient and deficient winter forage, and contagious ecthyma in lambs and adults. Recommendations for supplemental feeding were made.
Subject: BE2 DP2 MA3 RA2 Area: B Source: ANNB

SH0139

Horejsi, B. 1972.
Behavioral differences in bighorn lambs (Ovis canadensis canadensis Shaw) during years of high and low survival.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972:51-73.

Relates behavioral differences in Rocky Mountain bighorn lambs to the expansion (or declination) of the population. The study area was the Sheep River area of southwest Alberta.
Subject: BE1 BE2 PD2 PD4 Area: B Source: KPNL

SH0151

Hudson, R.J., W.D. Kitts and V.C. Brink. 1972.
Habitat utilization by wildlife and livestock in the southern Rocky Mountain Trench, British Columbia.
Environment Canada.

Discusses habitat use by cattle, deer, elk and bighorn sheep in the southern Rocky Mountain trench in British Columbia. Range production and utilization, habitat, competition, nutrition, distributions, and some techniques for the study are included.
Subject: RA3 RA4 BE2 BE3 Area: A Source: CWSE

SH0148

Hudson, R.J., D.M. Hebert and V.C. Brink. 1976.
Occupational patterns of wildlife on a major East Kootenay winter-spring range.
J. Range Manage. 29(1):38-43.

Investigates range vegetation and domestic livestock as being an important factors in the distributions and range use of deer, elk and bighorn sheep. Methods of observation were discussed. The study area was the Premier Ridge in southeastern British Columbia.
Subject: RA4 BE2 BE3 RT4 Area: A Source: CWSE

SH0164

Kerr, G.R. 1966.
Goat and sheep range distribution.
Alta. Dept. Lands and Forests Project W-1-65. Edmonton, Alberta.

The objectives of the survey were : (1) to determine current location and extent of Rocky Mountain goat and bighorn sheep ranges, (2) to classify ranges according to primary seasonal use and to delineate key areas, and (3) to map seasonal ranges. The survey included mountainous regions within the boundaries of either the Crowsnest or Bow River Forest Reserves. Details of vegetation, utilization and animal inhabitants are outlined for each numbered grazing allotment.
Subject: RA5 DP2 BE2 BE3 Area: B Source: AFWE

SH0419

Kindel, F. et al. 1970.
Idaho game populations census and range study.
F.A. Idaho Project No. W-85-R. Boise, Idaho.

Gives detailed account of populations, mortality due to hunting, diseases and parasites, range condition, migration, and other causes of mortality of bighorn sheep in Idaho.
Subject: PD1 BE2 RA5 MF1 Area: B Source: ANNB

SH0179

Loewen, A.B. 1971.
Bighorn sheep study, Disaster Point Range, Jasper National Park.
Can. Wildl. Serv. Edmonton, Alberta.

A detailed report documenting bighorn sheep herd movements and distributions each month. Included are climatic measurements taken over the years.
Subject: RA6 BE2 Area: B Source: CWSE

SH0185

Martin, S.A. and S.T. Stewart. 1980.
Migration of the Beartooth-Rock Creek bighorn sheep herd.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:332-354.

Outlines the results of a study dealing with distributions, movements and habitat use of Rocky Mountain bighorn sheep in the Rock Creek area of the Beartooth Mountains of Montana. Some advantages and consequences of the migration patterns are discussed.
Subject: BE2 BE3 Area: B Source: AFWE

SH0186

Matthews, J.W. 1973.
Ecology of bighorn sheep on Wildhorse Island, Flathead Lake, Montana.
M.S. Thesis, Univ. of Montana. Missoula, Montana.

A study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. Mortality factors and methodologies for the study are outlined in detail.
Subject: RT4 BE2 BE3 MF1 Area: B Source: CWSE

SH0196

McCann, L.J. 1953.
Ecology of the mountain sheep.
PhD. Thesis, Univ. of Utah. Salt Lake City, Utah.

The zoogeography, distribution, range conditions, diseases, competition, and social interactions of the genus Ovis in the United States are dicussed.
Subject: RA1 BE1 BE2 DP1 Area: B Source: ANNB

SH0406

McCann, L.J. 1956.
Ecology of the mountain sheep.
Amer. Midland Nat. 56:297-324.

Discussed: classification and distribution, physical characteristics, evolutionary implications, origin and recent history in North America, the Gros Ventre sheep range, behavior observations, herd organization and movements , food habits, natural enemies, accidents, parasites and disease, competition.
Subject: BE2 NP2 PD1 PD5 Area: B Source: ANNB

SH0198

McCollough, S.A., A.Y. Cooperrider and J.A. Bailey. 1980.
Impact of cattle grazing on bighorn sheep habitat at Trickle Mountain, Colorado.
1980 North. Wild Sheep and Goat Conf., Salmon, Idaho. April 23-25, 1980: 42-59.

The range and food habits of bighorn sheep in Colorado are documented. The effect of cattle grazing on these ranges is analyzed with respect to forage competition.
Subject: RA4 RA5 BE2 BE3 Area: B Source: CWSE

SH0200

McLean. 1973.
Ram Mountain study.
Dept. Lands and Forests, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Determines the limiting factors tending to stabilize the Ram Mountain sheep population. Documents trapping activities, mortality of marked sheep, inventory, general behavior, seasonal movements and distributions, and forage samples.
Subject: RA5 BE1 BE2 BE3 Area: B Source: AFWE

SH0495

Morgan, J.K. 1969.
Rocky Mountain bighorn sheep investigations.
Idaho Fish and Game Job Completion Report for Job W-85-R-19, #2.

Discusses population, movements and migrations, competition with other species, and food habits for the Morgan Creek bighorn sheep herd, Idaho. Management methods for both sheep and range, and further study recommendations are given. Some growth rates and productivity figures are included.
Subject: BE2 NP2 RA4 Area: B Source: WNPL

SH0472

Munro, J.A. and I.McT. Cowan. 1944.
Preliminary report on the birds and mammals of Kootenay National Park , British Columbia.
Can. Field Nat. 58:34-51.

Describes the distribution of the birds and mammals (including bighorn sheep) in Kootenay National Park, British Columbia.
Subject: BE2 Area: A Source: ANNB UOAL

SH0194

Mussell, D.J. 1982.
Utilization of the Kootenay Plains of western Alberta by ungulates.
Dept. Energy and Natural Resources, Alta. Prov. Govt. Edmonton, Alberta.

Describes ungulate use of the Kootenay Plains of western Alberta. Methods are first described in detail, and then present and past habitat use is stated. Included is the ecology of the study area. In light of the discussion, some proposed regional developments are given.
Subject: RA1 BE2 BE3 MA1 Area: B Source: AFWE

SH0213

Neff, D.J. 1968.
The pellet-group count technique for big game trend, census and distribution : a review.
J. Wildl. Manage. 32(3):597-614.

Discusses the method of pellet-group count as a determinant of population dynamics, range use and distributions of big game.
Subject: RT6 BE1 BE2 BE3 . Area: C Source: CWSE

SH0205

Nichols, L. 1970.
Aerial inventory and classification of Dall sheep in Alaska.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. 1970:25-33.

Outlines specific research techniques used in determining population dynamics and sheep behavior. Centers mainly on the method of aerial surveying.
Subject: RT6 BE2 Area: C Source: CWSE

SH0209

Oldemeyer, J.L., W.J. Barmore and D.L. Gilbert. 1971.
Winter ecology of bighorn sheep in Yellowstone National Park.
J. Wildl. Manage. 35(2):257-269.

Studies the range condition, vegetation, competition for food on the winter range, and the population and distribution of Rocky Mountain bighorn sheep in Yellowstone National Park.
Subject: RA4 BE2 BE3 NP2 Area: B Source: CWSE

SH0423

Pillmore, R.E. and C.A. Moser. 1970.
Bighorn sheep and mountain goat investigations.
F.A. Colorado Project No. W-41-R.

Topics such as artificial salting, census and distribution studies, comparitive range and stomach analysis, lambing study and predator loss of lambs, trapping and transplanting, mortality factors, management and improvement, and census techniques were covered.
Subject: BE2 RT7 DP2 Area: B Source: ANNB

SH0475

Ruxton, G.F. 1932.
Wildlife in the Rocky Mountains.
The MacMillan Co. New York.

Gives a general physical description of bighorn sheep in the Rocky Mountains and outlines their distribution.
Subject: BE2 PD5 Area: B Source: ANNB

SH0424

Schallenberger, A. 1970.
Population characteristics and harvest of bighorn sheep on the Sun River Area, Montana.
Trans. North.Wild Sheep Counc. p. 24 (Abst.).

Looks at the history and physiography, forage utilization, range condition , harvest through hunting, and trapping and transplanting of a herd of bighorn sheep in the Sun River Area, Montana. The results are then compared to those of bighorn sheep in Nevada.
Subject: PD1 PD5 BE2 Area: B Source: ANNB AFWE

SH0413

Service., Fish and Wildlife 1940.
Big game inventory of the United States.
USDI Fish and Wildl. Serv. Wildl. Leaflet BS-175.

The Rocky Mountain bighorn included Ovis canadensis canadensis and Ovis canadensis sierrae. An accounting was given of the numbers of these animals on biological survey land, national forests, national parks and monuments, Indian reservations, grazing districts, and State and private lands.
Subject: PD1 BE2 Area: B Source: ANNB

SH0251

Shannon, N.M., R.J. Hudson V.C. Brink and W.D. Kitts. 1975.
Determinants of spatial distribution of Rocky Mountain bighorn sheep.
J. Wildl. Manage. 39(2):387-401.

Relates seasonal distributions of Rocky Mountain bighorn sheep in southeastern British Columbia to various factors dealing with the range. Some aspects of range are slope, elevation and nitrogen content of palatable grasses.
Subject: BE2 RA1 Area: A Source: CWSE UOAL

SH0426

Simmons, N.M. 1962.
Daily and seasonal movements of Poudre River bighorn sheep.
Trans. Desert Bighorn Counc. 6:57-64.

Daily and seasonal movements of bighorn sheep of the Cache la Poudre , Colorado drainage were studied and related to weather changes, topographic and vegetative characteristics, the presence of other animal species, and the availability of food, minerals and water. Data was collected primarily during the spring and summer months of 1960.
Subject: BE2 RA6 Area: B Source: UOAL ANNB

SH0358

Simmons, N.M. 1961.
Daily and seasonal movements of Poudre River bighorn sheep.
Unpub. MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Daily and seasonal movements were related to weather changes, topographic characteristics, vegetative characteristics, presence of other species, and availability of food, water and minerals, Most observations were of adult ewe, yearling, lamb groups.
Subject: BE2 BE3 NP2 Area: B Source: ANNB

SH0264

Smith, D., W. Wishart and G. Lynch. 1977.
Bighorn ram movements at Cadomin, Alberta.
1975-76 Job Progress Report, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Summarizes results of a project to study movements of bighorn rams near Cadomin, Alberta. Documents the distance of ram movements, frequency and timing of these movements, proportion of rams involved, and some causes of sheep mortality. Specific habitats, and location of sheep winter ranges are also determined.
Subject: BE2 BE3 MF1 Area: B Source: AFWE

SH0263

Smith, K. and W. Wishart. 1977.
Ram Mountain bighorn sheep study progress report - 1976.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Discusses the effects of orphaning bighorn lambs on Ram Mountain, Alberta. Positive and negative aspects of the non-trophy season, distributions and movements of the sheep, and factors influencing this are also discussed.
Subject: PD3 PD4 BE2 MF4 Area: B Source: AFWE

SH0284

Stelfox, J.G 1971.
Bighorn sheep in the Canadian Rockies : a history 1800-1970.
Can. Field Nat. 85(2):101-122.

Documents the history of bighorn sheep populations, their number and distribution, from 1800 to 1970 on the east slopes of the Rocky Mountains, and the west slopes in Kootenay National Park.
Subject: BE2 PD2 PD5 Area: A Source: KPWL CWSE

SH0279

Stelfox, J.G. 1968.
Population dynamics and range ecology of bighorn sheep in Rocky Mountain national parks. Phase 1 : population fluctuations of bighorn sheep in the Canadian Rocky Mountains from 1800 to 1967.
Can. Wildl. Serv. Edmonton, Alberta.

The report gives a detailed history of population dynamics of bighorn sheep of the East slopes of the Rocky Mountains in Alberta. Environmental factors were analyzed in order to determine their role in the population fluctuations.
Subject: PD2 RA1 MF1 BE2 Area: A Source: CWSE

SH0271

Stelfox, J.G. 1966.
An investigation of the current status of bighorn sheep (Ovis canadensis canadensis) in the Radium Hot Springs Area, B.C.
Can. Wildl. Serv. Edmonton, Alberta.

This study documents the status of bighorn sheep in the Radium Hot Springs area, British Columbia. Includes range condition and trend, herd population and distributions as well as diseases and parasites affecting the sheep.
Subject: RA2 BE2 DP2 Area: A Source: CWSE KPNL

SH0296

Stelfox, J.G. 1978.
Seasonal distributions of Rocky Mountain bighorn sheep in Canadian national parks : 1966-1972.
Can. Wildl. Serv. Report to Parks Canada. Edmonton, Alberta.

A detailed analysis of the seasonal distributions of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks.
Subject: BE2 Area: A Source: CWSE KPNL KPWL

SH0281

Stelfox, J.G. 1969.
Status of bighorn sheep at Vermilion Lakes, Banff National Park, May 1969.
Can. Wildl. Serv. Edmonton, Alberta.

This paper outlines the range conditions and general population status of the Vermilion Lakes herd of bighorn sheep. Some management suggestions for this particular herd are included.
Subject: RA1 MA1 BE2 Area: B Source: CWSE KPWL

SH0283

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Rocky Mountain national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Documents population fluctuations, abundance and distribution, diseases and parasitism, and the ecology of the winter ranges of bighorn sheep in Kootenay, Waterton, Banff and Jasper National Parks.
Subject: PD4 BE2 DP1 RA2 Area: A Source: CWSE

SH0275

Stelfox, J.G. 1967.
Bighorn sheep abundance and distribution in Banff, Jasper, Waterton Lakes and Kootenay National Parks, 1966-1967.
Can. Wildl. Serv. Edmonton, Alberta.

Presents data on populations and distributions (especially seasonal abundance and herd distributions). The populations are correlated to range conditions and trends, and these are investigated as to their responsibility for population declines.
Subject: PD2 BE2 RA2 Area: A Source: CWSE

SH0269

Stelfox, J.G. 1964.
Bighorn ecological study in the Coalbranch Region (Drummond Creek south to Ruby Creek).
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents range conditions, distribution and population of bighorn sheep and elk herds in the Drummond-Ruby Creek region of the Coalbranch, in order that some effective management proposals could be outlined.
Subject: PD1 BE1 BE2 MA1 Area: B Source: CWSE

SH0303

Stelfox, J.G. and R.D. Taber. 1969.
Big game in the northern Rocky Mountain coniferous forest.
Coniferous Forests of the Rocky Mountains : Proc. 1968 Symp.:197-222.

Discusses range vegetation, seasonal distributions and management techniques for big game (wapiti, deer, moose, caribou, bison, mountain goats and bighorn sheep) in the coniferous forest of the northern Rocky Mountains.
Subject: RA1 BE2 MA2 Area: B Source: CWSE

SH0305

Stewart, S.T. 1975.
Ecology of the West Rosebud and Stillwater bighorn sheep herds, Beartooth Mountains, Montana.
Project W-120-R-6 and 7, Statewide Wildl. Research, State of Montana.

Studies population, range use, food habits and movements of bighorn sheep in the Beartooth Mountains, Montana. Documents habitat types, total standing crop of forage and protein content of principle forage species in order to evaluate possible effects on the bighorn sheep.
Subject: RA3 BE2 BE3 NP2 Area: B Source: AFWE

SH0497

Sturko, A.N. 1969.
Rocky Mountain bighorn sheep, Waterton Lakes National Park.
Report by Chief Park Warden, Waterton Lakes Nat. Park.

Documents physical characteristics (age, weight, length of horns, chest girth and general health condition) and migration patterns of Rocky Mountain bighorn sheep in Waterton Lakes National Park.
Subject: PD2 BE2 PD4 Area: B Source: WNPL

SH0310

Sullivan, J.P. and J.G. Stelfox. 1974.
Wildlife food habits and seasonal ranges in Jasper townsite area, summer 1974.
Can. Wildl. Serv. Report for Parks Canada. Edmonton, Alberta.

Documents the seasonal distributions of the Rocky Mountain bighorn sheep of the Graveyard Herd, near Jasper, Alberta.
Subject: BE2 Area: B Source: CWSE

SH0368

Tilton, M.E. and E.E. Willard. 1982.
Winter habitat selection by mountain sheep.
J. Wildl. Manage. 46(2):359-366.

This paper quantitatively describes the habitat used by mountain sheep in winter, identifies the selection of sites among those available, and evaluates the preference of mountain sheep for biotic and abiotic environmental variables on winter range. The study involved bighorn sheep (Ovis canadensis) near Thompson Falls in northwestern Montana, during the winter of 1975-76.
Subject: BE2 BE3 Area: B Source: UOAL

SH0499

Watt, R. 1983.
Wildlife survey - March 26, 1983, Waterton Lakes National Park.
Waterton Lakes Nat. Park Warden Serv.

Documents results of aerial and ground surveys of wildlife in Waterton Lakes National Park, March 26, 1983. Details of methods used and costs of the operations are included.
Subject: RT6 BE2 PD1 Area: B Source: AWFL

SH0498

Watt, R. 1983.
Wildlife survey, Waterton Lakes National Park.
Waterton Lakes Nat. Park Warden Serv.

Documents the results of aerial and ground surveys of wildlife in Waterton Lakes National Park, Feb. 3, 1983. Details of methods used and costs incurred are included.
Subject: RT6 BE2 PD1 Area: B Source: AFWL

SH0334

Wishart, W.D. 1958.
The bighorn sheep of the Sheep River Valley.
Unpub. MSc. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study conducted in the Sheep River Valley, Alberta. Topics included are food habits, various mortality factors, some seasonal movements, and management techniques.
Subject: MF1 BE2 NP2 MA1 Area: B Source: CWSE UOAL

SH0335

Wishart, W.D. 1962.
The Sheep River bighorn tagging program, 1955-1962.
Alta. Fish and Wildl. Edmonton, Alberta.

Describes difficulties involved in studying distributions and seasonal movements of bighorn sheep in Alberta, using methods of trapping and tagging. Includes a description of the drugs used for immobilization.
Subject: RT6 BE2 Area: B Source: AFWE

SH0336

Wishart, W.D. 1966.
Bighorn population and harvest study.
Wildl. Investigations Report, Alta. Fish and Wildl. Edmonton, Alberta.

Documents the sex and age structure, population numbers of bighorn sheep, and the location of 19 winter ranges in Alberta. This information is then related to the present harvest methods.
Subject: PD1 BE1 BE2 MA4 Area: B Source: AFWE

SH0347

Wood, J.E. 1960.
A bibliography of bighorn sheep.
Trans. Desert Bighorn Counc. 4:101-111.

The 180 references were divided into ecology and management, inventories and hunting records, general references to taxonomy, geographic areas, distribution, predation, parasites and diseases, reproduction and miscellaneous notes, techniques and popular articles of a general nature.
Subject: BW MA1 BE2 DP1 Area: C Source: ANNB

SH0351

Woolf, A. 1968.
Summer ecology of bighorn sheep in Yellowstone National Park.
Unpub. MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents population size and distribution of bighorn sheep in Yellowstone National Park. The dominant plant and staple foods and potential elk competition is discussed.
Subject: BE2 NP2 RA4 Area: B Source: ANNB

SH0355

Woolf, A., T. O'Shea and D.L. Gilbert. 1970.
Movements and behavior of bighorn sheep on summer ranges in Yellowstone National Park.
J. Wildl. Manage. 34(2):446-450.

Herd behavior and movements of bighorn sheep in Yellowstone National Park during the summers of 1966 and 1967 are discussed.
Subject: BE1 BE2 Area: B Source: CWSE

HABITAT SELECTION AND UTILIZATION (BE3)

SH0001

Adams, L.G., K.L. Risenhoover and J.A. Bailey. 1982.
Ecological relationships of mountain goats and Rocky Mountain bighorn sheep.
North. Wild Sheep and Goat Counc., Proc. of the Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:9-21.

Discusses the competition between mountain goats and bighorn sheep after mountain goats were introduced into Colorado. Their ecological relationships and adaptations are also discussed. Management considerations are included.
Subject: BE3 NP2 RA4 MA1 Area: B Source: AFWE

SH0006

Anonymous. 1970.
Kootenay National Park provisional master plan.
Queen's Printer for Canada. Ottawa, Canada.

Outlines Kootenay National Park's land use plans, park programs, natural resources, visitor use data and future studies and planning projects. It is a good reference for the history and general ecology of the park.
Subject: RA1 RA6 BE3 Area: A Source: AFWE

SH0014

Barmore, W.J. 1962.
Bighorn sheep and their habitat in Dinosaur Monument.
MSc. Thesis, Utah State Univ. Logan, Utah.

Describes the ecology, condition, utilization and geography of the Dinosaur

Monument sheep range. Bighorn sheep population dynamics and some diseases are described as well. Management considerations are included.
Subject: RA2 RA3 BE3 PD1 Area: B Source: ANNB

SH0020

Berger, J. 1980.
The ecology, structure and functions of social play in bighorn sheep (Ovis canadensis).
J. Zoology, London. 192:531-542.

Relates differing social play behavior to differing habitat for California and Rocky Mountain bighorn sheep, and Stone and Dall sheep.
Subject: PD1 BE1 BE3 Area: C Source: UOAL

SH0490

Brady, K.S. D = 1973
Ungulate abundance and distribution, Waterton Lakes National Park.
Compiled for Waterton Lakes Nat. Park Warden Service.

This is a report on the abundance and distribution of ungulates in Waterton Lakes National Park covering the period from March, 1971 to November, 1973, inclusive....A total of six ungulate species are dealt with in the report under subheadings in regard to status, distribution and habitat preference, followed by general remarks.
Subject: BE2 BE3 PD1 Area: B Source: AFWL

SH0037

Capp, J.C. 1967.
Competition among bighorn sheep, elk, and deer in Rocky Mountain National Park, Colorado.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Discusses the vegetative composition and climate of the range, and the usage by various species of ungulates. The seasonal movements and distributions, occupancy of habitat types, and food preferences for each of sheep, elk and deer in Rocky Mountain National Park, Colorado, are given. Competition for range among these three ungulates is analyzed in terms of the above.
Subject: RA4 RA6 BE3 NP2 Area: B Source: CWSE

SH0043

Constan, K.J. 1967.
Bighorn sheep range use, food habits and relationships to mule deer and elk in Gallatin Canyon.
Montana Fish and Game Dept.

Detailed description of range use, food habits and interspecific relationships of bighorn sheep, mule deer and elk. Some research techniques were also included.
Subject: RA4 BE3 NP2 RT4 Area: B Source: CWSE

SH0044

Constan, K.J. 1972.
Winter foods and range use of three species of ungulates.
J. Wildl. Manage. 36(4):1068-1076.

Documents range use, food habits, population characteristics and interspecific relationships of bighorn sheep, mule deer and elk on the Deer Creek - Asbestos Creek winter-spring range in Gallatin Canyon, Montana.
Subject: RA4 PD1 BE3 NP2 Area: B Source: UOAL

SH0050

Cooperrider, E.B. and R.M. Hansen. 1982.
Forage selection by bighorn sheep ewes and lambs in southcentral Colorado.
The Third Biennial Symp. of the North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:262-277.

Documents summer food habits of Rocky Mountain bighorn sheep ewes and lambs on two lambing ranges in southcentral Colorado. Compares the diets to botanical composition and herbage production of each area.
Subject: BE3 NP2 Area: B Source: AFWE

SH0053

Cowan, I.McT. 1950.
Some vital statistics of big game on overstocked mountain range.
Trans. of the Fifteenth North Amer. Wildl. Conf., San Francisco, California. March 6,7,9, 1950:581-588.

Outlines the sex ratios, fertility and effective reproduction of big game animals on overstocked mountain ranges in Jasper, Banff, Kootenay and Yoho national parks. Includes a description of range vegetation and utilization.
Subject: PD1 PD4 RA3 BE3 Area: A Source: UOAL

SH0058

Dale, A.R. and J.A. Bailey. 1982.
Application of optimal foraging theory for bighorn sheep habitat evaluation.
Third Biennial Symp. of the North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:254-261.

Describes a method for measuring forage efficiency of bighorn sheep in Waterton Canyon, Colorado. The method uses the optimal foraging theory and relates it to the distribution and sizes of potential bites, and availability for efficient harvest by bighorns.
Subject: RA2 BE3 NP2 RT4 Area: B Source: AFWE

SH0063

Demarchi, D.A. 1971.
An outline of a quantitative ecology technique employing a macroplot with sub-sampling procedures.
B.C. Fish and Wildlife, Ministry of the Environment. Victoria, British Columbia.

Detailed description of the method of employing a macroplot with sub-sampling procedures in measuring the productivity of a bighorn sheep winter range. Included are descriptions of the macroplot design of Poulton and Tisdale (1961) and the canopy coverage technique of plot analysis by Daubenmire (1959, 1968).
Subject: RT4 BE3 Area: A Source: BFWV CWSE

SH0060

Demarchi, D.A. 1966.
Productivity of the Stoddart Creek winter range.
Fish and Wildlife Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

This report outlines the methods and techniques used to estimate productivity of the bighorn sheep winter range at Stoddart Creek in southeastern British Columbia. Forage sample descriptions are compiled for each site.
Subject: RA1 RT4 BE3 Area: A Source: KPNL

SH0478

Demarchi, R.A. 1968.
Chemical composition of bighorn winter forages.
J. Range Manage. 21(6):385-388.
Subject: RA5 RA6 BE3 Area: B Source: UOAL CWSE

SH0113

Geist, V. 1974.
On the management of mountain sheep : theoretical considerations.
Paper presented at : North. Wild Sheep Counc., Great Falls, Montana. April, 1974.

Discusses the management of mountain sheep (Ovis canadensis and Ovis dalli) in relation to their biology.
Subject: MA1 MA2 RA4 BE3 Area: B Source: CWSE

SH0114

Geist, V. and R.G. Petocz.
On the temporal and spatial occupation patterns of a wintering area by bighorn sheep and their theoretical implications.
The Univ. of Calgary. Calgary, Alberta.

Investigates whether sheep populations have a predictable pattern of home range occupation in time and space. Discusses spatial distributions as being affected by preference for cliff terrain, winter conditions and food habits. Some management considerations are discussed. The study area is the Palliser Range in Banff National Park, Alberta.
Subject: BE2 BE3 PD5 Area: B Source: AFWE

SH0115

Geist, V. and R.G. Petocz. 1977.
Bighorn sheep in winter : Do rams maximize reproductive fitness by spatial and habitat segregation from ewes?
Can. J. Zool. 55(11):1802-1810.

Discusses the seasonal distributions of rams and ewes (Rocky Mountain bighorn sheep) on the Palliser Range of Banff National Park. Investigates the seperation of ewes and rams during the winter with respect to vegetation, climate and competition between male and female. The geography of the range is also taken into consideration.
Subject: BE2 BE3 BE5 PD4 Area: B Source: CWSE

SH0118

Grunigen, R.E. 1980.
A system for evaluating potential bighorn sheep transplant sites in northern New Mexico.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:211-228.

Evaluates six ranges in New Mexico by assessing important habitat parameters, to determine suitability for bighorn sheep transplants. Discusses applications and limitations of this habitat evaluation system in range suitability, and in developing management strategies for the sheep.
Subject: RT4 MA1 BE3 Area: C Source: AFWE

SH0126

Hebert, D.M. 1973.
Altitudinal migration as a factor in the nutrition of bighorn sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

A documented account detailing the nutrition of Rocky Mountain bighorn sheep in an area centered in the Rocky Mountain Trench between Elko and Premier Ridge. Outlines diet in various areas, including an analysis of nutrients. The results include research techniques employed while studying animal trials and simulated altitudinal migration, as well as the outcome of these experiments on the sheep. The paper is very specific on details regarding the subject matter.
Subject: BE2 BE3 RT9 NP1 Area: A Source: UBCL

SH0132

Hickey, W.O. 1973.
Bighorn sheep ecology, job progress report.
Idaho Fish and Game Dept. Salmon, Idaho.

A report on vegetation, habitat, seasonal movements and distributions, and population dynamics of bighorn sheep in Idaho.
Subject: BE2 BE3 NP2 PD1 Area: B Source: CWSE

SH0148

Hudson, R.J., D.M. Hebert and V.C. Brink. 1976.
Occupational patterns of wildlife on a major East Kootenay winter-spring range.
J. Range Manage. 29(1):38-43.

Investigates range vegetation and domestic livestock as being an important factors in the distributions and range use of deer, elk and bighorn sheep. Methods of observation were discussed. The study area was the Premier Ridge in southeastern British Columbia.
Subject: RA4 BE2 BE3 RT4 Area: A Source: CWSE

SH0482

Hudson, R.J., W.D. Kitts and V.C. Brink. 1972.
Habitat utilization by wildlife and livestock in the southern Rocky Mountain Trench, British Columbia.
Progress Report 1972 to Environment Canada, Can. Wildl. Serv. Edmonton, Alberta.
Subject: RA3 BE3 Area: B Source: CWSE

SH0151

Hudson, R.J., W.D. Kitts and V.C. Brink. 1972.
Habitat utilization by wildlife and livestock in the southern Rocky Mountain Trench, British Columbia.
Environment Canada.

Discusses habitat use by cattle, deer, elk and bighorn sheep in the southern Rocky Mountain trench in British Columbia. Range production and utilization, habitat, competition, nutrition, distributions, and some techniques for the study are included.
Subject: RA3 RA4 BE2 BE3 Area: A Source: CWSE

SH0158

Johnson, J.D. 1975.
An evaluation of bighorn sheep range on Ram Mountain, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Documents, in detail, the geography (climate and soil) and vegetation of 20 sample sites on the bighorn sheep range at Ram Mountain, Alberta. Also outlines the techniques and methods used.
Subject: RA6 RT4 BE3 Area: B Source: AFWE

SH0164

Kerr, G.R. 1966.
Goat and sheep range distribution.
Alta. Dept. Lands and Forests Project W-1-65. Edmonton, Alberta.

The objectives of the survey were : (1) to determine current location and extent of Rocky Mountain goat and bighorn sheep ranges, (2) to classify ranges according to primary seasonal use and to delineate key areas, and (3) to map seasonal ranges. The survey included mountainous regions within the boundaries of either the Crowsnest or Bow River Forest Reserves. Details of vegetation, utilization and animal inhabitants are outlined for each numbered grazing allotment.
Subject: RA5 DP2 BE2 BE3 Area: B Source: AFWE

SH0175

Lauer, J.L. and J.M. Peek. 1976.
Big game - livestock relationships on the bighorn sheep winter range, east fork, Salmon River, Idaho.
Bureau of Land Management, United States Dept. of the Interior. Moscow, Idaho.

Detailed analysis of food habits, range vegetation and competition between bighorn sheep and livestock on the sheep winter range, east fork of Salmon River, Idaho.
Subject: RA4 BE3 NP2 Area: B Source: CWSE

SH0178

Light, J.T., R. Zrelak and H. Graham. 1966.
San Gorgonio bighorn management plan.
U.S. Forest Service.

This plan describes a herd of 75 bighorn in the San Gorgonio Mountain area, and their habitat. It outlines problems occurring in this area, and sets up a management plan to deal with these problems.

Subject: MA1 MA2 MA3 BE3 Area: C Source: CWSE

SH0185

Martin, S.A. and S.T. Stewart. 1980.
Migration of the Beartooth-Rock Creek bighorn sheep herd.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:332-354.

Outlines the results of a study dealing with distributions, movements and habitat use of Rocky Mountain bighorn sheep in the Rock Creek area of the Beartooth Mountains of Montana. Some advantages and consequences of the migration patterns are discussed.
Subject: BE2 BE3 Area: B Source: AFWE

SH0186

Matthews, J.W. 1973.
Ecology of bighorn sheep on Wildhorse Island, Flathead Lake, Montana.
M.S. Thesis, Univ. of Montana. Missoula, Montana.

A study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. Mortality factors and methodologies for the study are outlined in detail.
Subject: RT4 BE2 BE3 MF1 Area: B Source: CWSE

SH0198

McCollough, S.A., A.Y. Cooperrider and J.A. Bailey. 1980.
Impact of cattle grazing on bighorn sheep habitat at Trickle Mountain, Colorado.
1980 North. Wild Sheep and Goat Conf., Salmon, Idaho. April 23-25, 1980: 42-59.

The range and food habits of bighorn sheep in Colorado are documented. The effect of cattle grazing on these ranges is analyzed with respect to forage competition.
Subject: RA4 RA5 BE2 BE3 Area: B Source: CWSE

SH0200

McLean. 1973.
Ram Mountain study.
Dept. Lands and Forests, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Determines the limiting factors tending to stabilize the Ram Mountain sheep population. Documents trapping activities, mortality of marked sheep, inventory, general behavior, seasonal movements and distributions, and forage samples.
Subject: RA5 BE1 BE2 BE3 Area: B Source: AFWE

SH0191

Morgantini, L.E. 1979.
Habitat selection and resource division among bighorn sheep, elk and mule deer in western Alberta.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Discusses the habitat, and the manner in which the species co-exist through division of habitat, of the Rocky Mountain bighorn sheep, elk and mule deer in the Red Deer River Valley, westcentral Alberta. Defines the operational

components which had an effect on the animals and caused a physiological or behavioral response.
Subject: RA4 BE3 Area: B Source: UOAL CWSE

SH0194

Mussell, D.J. 1982.
Utilization of the Kootenay Plains of western Alberta by ungulates.
Dept. Energy and Natural Resources, Alta. Prov. Govt. Edmonton, Alberta.

Describes ungulate use of the Kootenay Plains of western Alberta. Methods are first described in detail, and then present and past habitat use is stated. Included is the ecology of the study area. In light of the discussion, some proposed regional developments are given.
Subject: RA1 BE2 BE3 MA1 Area: B Source: AFWE

SH0213

Neff, D.J. 1968.
The pellet-group count technique for big game trend, census and distribution : a review.
J. Wildl. Manage. 32(3):597-614.

Discusses the method of pellet-group count as a determinant of population dynamics, range use and distributions of big game.
Subject: RT6 BE1 BE2 BE3 Area: C Source: CWSE

SH0208

Oldemeyer, J.L. 1966.
Winter ecology of bighorn sheep in Yellowstone National Park.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents results of a bighorn sheep study conducted on the northern winter range of Yellowstone National Park, Wyoming. Range condition and utilization, animal population numbers, and competition between elk and sheep are discussed.
Subject: RA2 RA3 RA4 BE3 Area: B Source: ANNB

SH0209

Oldemeyer, J.L., W.J. Barmore and D.L. Gilbert. 1971.
Winter ecology of bighorn sheep in Yellowstone National Park.
J. Wildl. Manage. 35(2):257-269.

Studies the range condition, vegetation, competition for food on the winter range, and the population and distribution of Rocky Mountain bighorn sheep in Yellowstone National Park.
Subject: RA4 BE2 BE3 NP2 Area: B Source: CWSE

SH0410

Potts, M.K. 1941.
A second report upon the status of bighorn in Rocky Mountain Park.
On file, Office of Chief Park Ranger. Rocky Mountain National Park, Colorado.

This was a continued report of the status of bighorn sheep in Rocky Mountain National Park. A study was completed to determine the number,

distribution, and ranges of the bighorn. Two pneumonia bacteria, Pasteurella oviseptica and Corynebacterium pyogenes, were mentioned....The paper also dealt with the habitat and ranges of the animals.
Subject: DP2 BE3 NP2 Area: B Source: ANNB

SH0229

Riggs, R.A. and J.M. Peek. 1980.
Mountain sheep habitat-use patterns related to post-fire succession.
J. Wildl. Manage. 44(4):933-938.

Investigates the longterm effects of fire on the use of mountain sheep winter ranges in Glacier National Park. Includes the relationship of climate and vegetation to range use.
Subject: RA2 RA6 BE3 Area: B Source: CWSE

SH0231

Risenhoover, K.L. and J.A. Bailey. 1980.
Visibility : an important habitat factor for an indigenous, low-elevation bighorn herd in Colorado.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:18-28.

Presents data on behavioral responses of bighorns to variations in vegetation density and consequent variation in visibility. The sheep are Rocky Mountain bighorns in Waterton Canyon, Colorado. Also discusses the importance of visibility to success of predator-evasion strategy of the sheep, and management implications of visibility in sheep habitats.
Subject: BE1 BE3 Area: B Source: AFWE

SH0232

Rominger, E.M. and J.A. Bailey. 1982.
Forage preference indices : adjusting forage availability data for habitat selection.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:278-286.
Subject: BE3 NP2 RT4 Area: B Source: AFWE

SH0252

Shepherd, H.R. 1975.
Vegetation of two dissimilar bighorn sheep ranges in Colorado.
Colorado Div. Wildl., Project W-101-R.

Provides basic habitat and vegetational information useful in appraising results of food habits, nutrition and disease studies. Ecological descriptions of study areas, and details of the study methods are given. Detailed analysis of the habitat types for each of the winter, intermediate and lambing ranges are given for each area. Study areas are the Trickle Mountain and Buffalo Peaks Areas, Colorado.
Subject: RA5 RA6 BE3 NP2 Area: B Source: AFWE

SH0358

Simmons, N.M. 1961.
Daily and seasonal movements of Poudre River bighorn sheep.
Unpub. MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Daily and seasonal movements were related to weather changes, topographic characteristics, vegetative characteristics, presence of other species, and availability of food, water and minerals. Most observations were of adult ewe, yearling, lamb groups.
Subject: BE2 BE3 NP2 Area: B Source: ANNB

SH0257

Singleton, J. 1976.
Food habits of wild ungulates in British Columbia : bibliography and plant synopsis.
B.C. Fish and Wildl. Branch.

Describes food habits of moose, elk, deer, mountain goats and bighorn and thinhorn sheep in British Columbia. Included is a bibliography for each animal as well as a plant synopsis for each habitat.
Subject: BE3 NP2 BW Area: A Source: CWSE

SH0264

Smith, D., W. Wishart and G. Lynch. 1977.
Bighorn ram movements at Cadomin, Alberta.
1975-76 Job Progress Report, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Summarizes results of a project to study movements of bighorn rams near Cadomin, Alberta. Documents the distance of ram movements, frequency and timing of these movements, proportion of rams involved, and some causes of sheep mortality. Specific habitats, and location of sheep winter ranges are also determined.
Subject: BE2 BE3 MF1 Area: B Source: AFWE

SH0280

Stelfox, J.G. 1969.
Ungulates as primary consumers.
Lecture presented at 8'th Annual Regional Park Warden 2 School, May 27, 1969 at Jasper National Park.

Discusses the relationships of wild ungulates to plant associations, and the effects of environmental carrying capacities, seasonal changes in forage nutrition and palatability, and climate on ungulates in the Canadian Rocky Mountains. Some general population distributions are included as well.
Subject: BE3 RA2 RA4 RA5 Area: A Source: CWSE

SH0305

Stewart, S.T. 1975.
Ecology of the West Rosebud and Stillwater bighorn sheep herds, Beartooth Mountains, Montana.
Project W-120-R-6 and 7, Statewide Wildl. Research, State of Montana.

Studies population, range use, food habits and movements of bighorn sheep in the Beartooth Mountains, Montana. Documents habitat types, total standing crop of forage and protein content of principle forage species in order to evaluate possible effects on the bighorn sheep.
Subject: RA3 BE2 BE3 NP2 Area: B Source: AFWE

SH0312

Tanner, H.C. 1950.
Investigation into the competition between elk and big-horned sheep in the Cascade Valley, Banff National Park, 1950.
Can. Wildl. Serv. Edmonton, Alberta.

Documents the condition of the alpine meadows in the Cascade Valley, and discusses competition between elk and bighorn sheep in that area, with respect to range utilization.
Subject: RA2 RA4 BE3 Area: B Source: CWSE

SH0368

Tilton, M.E. and E.E. Willard. 1982.
Winter habitat selection by mountain sheep.
J. Wildl. Manage. 46(2):359-366.

This paper quantitatively describes the habitat used by mountain sheep in winter, identifies the selection of sites among those available, and evaluates the preference of mountain sheep for biotic and abiotic environmental variables on winter range. The study involved bighorn sheep (Ovis canadensis) near Thompson Falls in northwestern Montana, during the winter of 1975-76.
Subject: BE2 BE3 Area: B Source: UOAL

SH0115

Geist, V. and R.G. Petocz. 1977.
Bighorn sheep in winter : Do rams maximize reproductive fitness by spatial and habitat segregation from ewes?
Can. J. Zool. 55(11):1802-1810.

Discusses the seasonal distributions of rams and ewes (Rocky Mountain bighorn sheep) on the Palliser Range of Banff National Park. Investigates the seperation of ewes and rams during the winter with respect to vegetation, climate and competition between male and female. The geography of the range is also taken into consideration.
Subject: BE2 BE3 BE5 PD4 Area: B Source: CWSE

BIBLIOGRAPHIES AND WORKSHOP PROCEEDINGS (BW)

SH0010

Anonymous. 1983.
Bighorn sheep die-off workshop proceedings.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A thorough investigation into the re-occurring disease outbreaks of Rocky Mountain bighorn sheep in southeastern British Columbia and southwestern Alberta. Various factors affecting bighorn populations are discussed, as well as general management techniques.
Subject: BW PD2 DP1 Area: A Source: CWSE BFWC

SH0477

Bailey, A.W. 1977.
Prescribed burning as an important tool for Canadian rangelands. In range improvement in Alberta : a literature review.
Univ. of Alberta. Edmonton, Alberta.
Subject: BW MA2 Area: A Source: CWSE

SH0087

Forrester, D.J., G.M. Forrester and C.M. Senger. 1966.
A contribution toward a bibliography on the lung nematodes of mammals.
Suppl. to J. Helminth.

The bibliography covers over 15 genera. Each section covered works dealing with distribution, taxonomy and morphology, life history, pathology, treatment and control, immunology, and relationships with other diseases.
Subject: BW Area: C Source: ANNB

SH0201

McGlinchy, S.E., R.A. Monson and P. Nash. 1971.
An annotated bibliography of the wild sheep of North America.
Rachelwood Wildlife Research Preserve Publication #1. New Florence, Pennsylvania.

Covers various topics on bighorn sheep in North America, such as diseases and parasites, range conditions, food habits, history, management, physical characteristics, competition and predation.
Subject: BW Area: B Source: CWSE AFWE

SH0204

Neiland, K.A. and C. Dukeminier. 1972.
A bibliography of the parasites, diseases and disorders of several important wild ruminants of the northern hemisphere.
Game Technical Bull. #3, Alaska Dept. Fish and Game.

Lists various publications pertaining to disease and parasites of bighorn sheep

and other ruminants.
Subject: BW DP1 DP2 Area: B Source: UADZ ADRI

SH0206

Novakowski, N.S. 1967.
Bighorn sheep study meeting, Edmonton, February 28, 1964.
Can. Wildl. Serv. Edmonton, Alberta.

Summarizes the concluding results of the meeting held to discuss factors affecting bighorn sheep populations within the Rocky Mountain national parks as well as other areas of Alberta and British Columbia. Management techniques are discussed in general for each area.
Subject: BW Area: A Source: CWSE

SH0409

Oldemeyer, J.L. 1966.
Review of literature on winter ecology of the Rocky Mountain sheep with special emphasis on Yellowstone National Park.

Covered history, behavior, diseases, predation, hunting, competition, population dynamics, food habits, distribution, etc. of Rocky Mountain bighorn sheep. The lifecycle of Protostrongylus stilesi according to Pillmore was also included.
Subject: BW Area: B Source: ANNB

SH0223

Poynter, D. and S. Selway. 1966.
Diseases caused by lungworms.
Helminth Abst. Rev. Article 35(2):113-114.

A bibliography on lungworms. The pages given are those pertaining to Protostronguylus.
Subject: DP2 BW Area: C Source: ANNB

SH0253

Simmons, N.M. 1967.
Mountain sheep literature review.
Can. Wildl. Serv. Fort Smith, North West Territories.

Gives alphabetical listing of authors and their works dealing with mountain sheep. Various periodicals are cited, as are the proceedings of various councils dealing with mountain sheep.
Subject: BW Area: B Source: AFWE

SH0257

Singleton, J. 1976.
Food habits of wild ungulates in British Columbia : bibliography and plant synopsis.
B.C. Fish and Wildl. Branch.

Describes food habits of moose, elk, deer, mountain goats and bighorn and thinhorn sheep in British Columbia. Included is a bibliography for each animal as well as a plant synopsis for each habitat.
Subject: BE3 NP2 BW Area: A Source: CWSE

SH0276

Stelfox, J.G. 1967.
Transactions of first northern wild sheep field study, May 1-9, 1967.
Can. Wildl. Serv. Report to Parks Canada.

Outlines the daily proceedings of the study. Documents various techniques used, as well as the general conditions of the herds. The study was conducted in Kootenay, Banff and Jasper National Parks.
Subject: PD1 BW RT5 RT6 Area: A Source: KPWL

SH0278

Stelfox, J.G. 1967.
Transactions of the first northern wild sheep conference, May 1-9, 1967.
Can. Wildl.Serv. Edmonton, Alberta.

Outlines the proceedings of the wild sheep conference. Topics discussed are population fluctuations, and techniques used in research. The study area is the Rocky Mountains of Alberta and British Columbia. Included are extensive literature reviews - on mountain sheep in general, as well as one on the techniques of field immobilization of animals.
Subject: BW PD2 DP2 RT5 Area: A Source: CWSE

SH0468

Stevenson, R. 1969.
Respiratory diseases of sheep.
Vet. Bull. 39:741-759.

Covers literature on the etiological agents which are associated with sheep pneumonia. Both Rocky Mountain bighorn sheep and domestic sheep were included in the review.
Subject: DP1 DP2 BW Area: B Source: ANNB

SH0308

Streeter, R.G. 1970.
A literature review on bighorn sheep population dynamics.
Special Report #24, Colorado Div. Game, Fish and Parks. Colorado.

Literature concerning the population dynamics of bighorn sheep (Ovis canadensis) is reviewed, synthesized and discussed under categories of population demography, breeding biology, nutrition, diseases and parasites, competition, predation and hunting.
Subject: BW PD1 DP1 MF1 Area: C Source: AFWE

SH0316

Todd, A.W. 1972.
A literature review on bighorn sheep food habits.
Colorado Div. Game, Fish and Parks.

Discusses bighorn food habits in some detail. An extensive bibliography on bighorn range ecology and forage preferences is also included.
Subject: BW NP2 Area: B Source: CWSE

SH0503

Trefethen, J.B. (Editor). 1975.
The wild sheep in modern North America.
Proc. workshop on the Management Biology of North American wild sheep. U of Montana, Missoula, July 18-20, 1974. Boone & Crockett Club. The Winchester Press, N.Y.

Purpose was to compile information on the status, distribution and trends of North American wild sheep populations, assess the impact of past and current management programs, determine the state of knowledge of the management biology of these populations and to develop management guidelines to assure the future well-being of wild sheep.
Subject: MA1 MA3 BW Area: B Source: CWSE

SH0327

Warburton, J.L. 1969.
A selected bibliography on the subject of bighorn sheep.
United States Dept. Interior, Bureau of Land Manage. Washington,D.C.

Compiles a list of references for all types of bighorn sheep. The index is arranged by subject matter.
Subject: BW Area: C Source: CWSE

SH0347

Wood, J.E. 1960.
A bibliography of bighorn sheep.
Trans. Desert Bighorn Counc. 4:101-111.

The 180 references were divided into ecology and management, inventories and hunting records, general references to taxonomy, geographic areas, distribution, predation, parasites and diseases, reproduction and miscellaneous notes, techniques and popular articles of a general nature.
Subject: BW MA1 BE2 DP1 Area: C Source: ANNB

SH0360

Wood, J.E. 1961.
Supplement to the bibliography of bighorn sheep.
Trans. Desert Bighorn Counc. 5:110-111.

Twenty-eight articles are listed.
Subject: BW Area: C Source: ANNB

SH0357

Yoakum, J. 1966.
Recent literature.
Trans. Desert Bighorn Counc. 10:119-122.

Twelve publications with abstracts are given.
Subject: BW Area: C Source: ANNB

DISEASES AND PARASITES (DP1)

SH0004

Allen, R.W. 1964.
Additional notes on the parasites of bighorn sheep on the Desert Game Ranch, Nevada.
Trans. Desert Bighorn Counc., Mexico. April 7-9, 1964:5-9.

Documents the incidence of Protostrongylus stilesi and Trichuris discolor in bighorn sheep on the Desert Game Ranch, Nevada.
Subject: DP1 DP2 Area: B Source: UOAL

SH0365

Allen, R.W. and H.G. Erling. 1964.
Parasites of bighorn sheep and mule deer in Arizona with new host records.
J. Parasit. 50(3):38.

Note was made of new parasites found on mule deer and parasites found on or in twelve bighorn sheep in Arizona.
Subject: DP1 DP2 Area: B Source: ANNB

SH0366

Allen, R.W., G.A. Schad and K.S. Samson. 1958.
Experimental cross-transmission of two strains of Haemonchus from wild ruminants to domestic sheep, with observations of their pathogenicity as compared with Haemonchus from domestic sheep.
J. Parasitol. 44(4):26.

Fecal samples from noncaptive bighorn sheep and Barbary sheep were collected and analyzed for two years. Larvae of Haemonchus recovered were given to domestic lambs. Infections from these wild strains were less severe than those from domestic strains.
Subject: DP1 Area: B Source: ANNB

SH0010

Anonymous. 1983.
Bighorn sheep die-off workshop proceedings.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A thorough investigation into the re-occurring disease outbreaks of Rocky Mountain bighorn sheep in southeastern British Columbia and southwestern Alberta. Various factors affecting bighorn populations are discussed, as well as general management techniques.
Subject: BW PD2 DP1 Area: A Source: CWSE BFWC

SH0397

Banfield, A.W.F. 1947.
The mammals of Waterton Lakes National Park, 1947.
Can. Wildl. Serv. Wildl. Manage. Bull. Series 1, No. 1. p. 11.

Documents die-offs due to pneumonia, sex and age ratios, condition and distribution, and food habits of bighorn sheep in Waterton Lakes National Park.
Subject: DP1 BE2 NP2 Area: B Source: CWSE ANNB

SH0018

Becklund, W.W. and C.M. Senger. 1967.
Parasites of Ovis canadensis canadensis in Montana, with a checklist of the internal and external parasites of the Rocky Mountain bighorn sheep in North America.
J. Parasitology 53(1):157-165.

Documents the incidence of parasites in Rocky Mountain bighorn sheep on the National Bison Range, Wild Horse Island and the Sun River area of Montana. Included is an extensive list of parasites of bighorn sheep and their distribution throughout North America.
Subject: DP1 DP2 Area: B Source: UOAL

SH0023

Biberstein, E.L., M.E. Meyer and P.C. Kennedy. 1958.
Colonial variation of Pasteurella haemolytica isolated from sheep.
J. Bacteriology 76(4):445-452.

Compares two types of Pasteurella haemolytica recovered from lambs in California.
Subject: DP1 Area: C Source: UABA

SH0027

Blood, D.A. 1971.
Contagious Ecthyma in Rocky Mountain bighorn sheep.
J. Wildl. Manage. 35(2):270-275.

Documents the condition and occurrence of contagious ecthyma in bighorn sheep of Jasper, Banff, Waterton and Kootenay national parks (western Alberta and eastern British Columbia).
Subject: DP1 Area: A Source: CWSE

SH0026

Blood, D.A. 1966.
Progress report on bighorn sheep investigations in the Rocky Mountain national parks.
Canadian Wildlife Service. Edmonton, Alberta.

A study investigating population dynamics and herd composition in Waterton and Jasper national parks. Included is data pertaining to contagious ecthyma in bighorn sheep in Banff, Jasper, Waterton, Kootenay and Glacier national parks.
Subject: PD1 PD4 RT6 DP1 Area: A Source: CWSE

SH0025

Blood, D.A. 1963.
Parasites from California bighorn sheep in southern British Columbia.
Canadian J. Zoology 41:913-918.

Documents parasite observations during a study of a herd of California bighorn sheep. States that the epidemic mortalities are not as characteristic of California bighorns as they are of Rocky Mountain bighorns.
Subject: DP1 Area: C Source: CWSE UBCL

SH0029

Boag, D.A. and W.D. Wishart. 1982.
Distribution and abundance of terrestrial gastropods on a winter range of bighorn sheep in southwestern Alberta.
Can. J. Zool. 60:2633-2640.

Documents distribution and abundance of terrestrial gastropods on the winter ranges of bighorn sheep at the Sheep River drainage, Alberta. Some research techniques are included. The results are discussed in relation to transmission of lungworm.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0361

Bond, R.M. 1936.
Special report on bighorn sickness in Glacier National Park.
U.S. National Park Serv. Glacier National Park Files.

Documents the incidence of pneumonia and other diseases in bighorn sheep at Glacier National Park. Descriptions of the lung condition in dead animals was outlined.
Subject: DP1 DP2 PD5 Area: B Source: ANNB

SH0036

Capelle, K.J. 1966.
The occurence of Oestrus ovis l. (Diptera:oestridae) in the bighorn sheep from Wyoming and Montana.
J. Parasitology. 52:618-621.

Three previous and five new records of the domestic sheep bot., Oestrus ovis, from the bighorn sheep are described. The life history and description of adult and larval forms are discussed as well as the significance of the occurrence of the parasite in the abnormal host.
Subject: DP1 Area: B Source: ANNB

SH0038

Carter, G. and R. Bain. 1960.
Pasteurellosis (Pasteurella multocida) - a review stressing recent development.
Vet. Rev. and Annot. 6(2):105-128.

A comprehensive review of pasteurellosis caused by Pasteurella multocida is given. Bacterial morphology, distribution, variation, biochemistry, etc. of research done in these fields as well as pathology are discussed. Types A,B and D have been isolated from sheep with 13 types untypeable. A list of references is included.
Subject: DP1 DP2 Area: C Source: ANNB

SH0042

Choquette, L.P.E. and E. Broughton. 1966.
Bighorn sheep investigation.
Can. Wildl. Service. Edmonton, Alberta.

A detailed investigation into the diseases and parasites affecting bighorn sheep in Kootenay National Park. Includes specific case histories of specimens examined in the park.
Subject: DP1 RT5 RT8 Area: A Source: CWSE

SH0054

Cowan, I.McT. 1951.
The diseases and parasites of big game mammals of western Canada.
Report of Proc. of the Fifth Annual Game Convention, Vancouver, Canada. April 25-28, 1951:37-64.

Documents in detail the diseases and parasites affecting game mammals of western Canada. Most data is taken from a survey of 121 big game animals (including 13 bighorn sheep). Each external and internal parasite of the host is listed and discussed.
Subject: DP1 DP2 Area: A Source: KPNL

SH0493

Cowan, I.McT. 1944.
Parasites, diseases and injuries of game animals in Banff, Jasper and Kootenay National Parks.
National Parks Bureau. Ottawa, Canada.

Documents incidence of parasites, diseases and injuries of game animals in Banff, Jasper and Kootenay National Parks during 1944.
Subject: DP1 DP2 RT5 Area: A Source: WNPL

SH0056

Crofton, H.D. 1963.
Nematode parasite population in sheep and on pasture.
The Commonwealth Agricultural Bureaux. Farnham Royal. Bucks, England.

Documents life histories and populations of various parasites known to affect sheep. Includes a consideration of control measures and the effect of climatic conditions on the pre-parasitic stages.
Subject: DP1 RT5 Area: C Source: CWSE

SH0455

Davis, J.W., L. Karstad and eds. D.O. Trainer 1970.
Infectious diseases of wild mammals.
Iowa State Univ. Ames, Iowa.

Gives general descriptions of various diseases of wild mammals. Bighorn sheep were described as being susceptible to actinomycosis, anaplasmosis, bluetongue disease, and foot rot. Discusses Pasteurellosis as part of the lungworm-pneumonia complex which affects sheep.
Subject: DP1 DP2 Area: B Source: ANNB

SH0070

DeMartini, J.C. and R.B. Davies. 1977.
An epizootic of pneumonia in captive bighorn sheep infected with Muellerius sp.
J. Wildl. Diseases 13(2):117-124.

Documents incidence of disease (Muellerius spp. in particular) in captive Rocky Mountain bighorn sheep in Colorado. Results are obtained through a series of isolations of viruses and bacteria.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0370

Dikmans, G. 1942.
New host-parasite records.
Proc. Helminth. Soc. Washington 9(2):65-66.

Discusses the incidence of Protostrongylus rushi in mountain goats and other animals.
Subject: DP1 Area: B Source: ANNB

SH0073

Dunn, A.M. 1968.
The wild ruminant as a reservoir host of helminth infections.
Symp. Zool. Soc. of London 24:221-248.

Ovis canadensis was listed as being the type species of all North American wild sheep. A list of 13 sp. of Nematodes and 3 sp. of Cestodes which can be carried by these wild sheep was given.
Subject: DP1 Area: C Source: UABA

SH0074

Duszynski, D.W., W.M. Samuel and D.R. Gray. 1977.
Three new Eimeria spp. (Protozoa: Eimeriidae) from muskoxen, Ovibos moschatus, with redescriptions of E. faurei, E. granulosa, and E. ovina from muskoxen and from a Rocky Mountain bighorn sheep, Ovis canadensis.
Can. J. Zool. 56(6):990-999.

Documents the incidence of three new Eimeria spp. in muskoxen and a Rocky Mountain bighorn sheep. Detailed descriptions as well as illustrations are given of the oocysts.
Subject: DP1 Area: B Source: CWSE

SH0076

Emerson, K.C. 1962.
A new species of Mallaphaga from the bighorn sheep.
J. of the Kansas Entomological Soc. 35(4):369.

Documents isolation of Bovicola jellisoni from Rocky Mountain bighorn sheep in Montana.
Subject: DP1 Area: B Source: UABA

SH0381

Forrester, D.J. and E. Wada. 1967.
An attempt to isolate viruses from lung tissue and lung nematodes of bighorn sheep.
J. Wildl. Dis. Assoc. 3:74-77.

This study was done to try to isolate PI-3 viruses and/or other respiratory viruses from lungs of bighorn sheep. Describes the research methods in detail, and makes suggestions for further studies.
Subject: DP1 RT5 Area: B Source: ANNB

SH0116

Goodson, N.J. 1982.
Effects of domestic sheep grazing on bighorn sheep populations : a review.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:287-313.

Reviews the effects of domestic sheep grazing on the ranges of Rocky Mountain bighorn sheep populations in the Big-Belt Mountains of westcentral Montana. The paper is divided into three categories : competition for forage, space, and transmission of diseases. Included are recent reports of die-offs and transplants of sheep in various areas of North America.
Subject: RA4 DP1 PD2 Area: A Source: AFWE

SH0384

Hadlow, W.J. and 1962.
Amyloidosis in Rocky Mountain bighorn sheep.
J. Amer. Vet. Med. Assoc. 141(2):243-247.

Documents the finding of conspicuous amyloid in three bighorn sheep necropsied. Discusses susceptibility of the sheep to the associated disease.
Subject: DP1 Area: B Source: ANNB

SH0373

Honess, R.F. 1942.
Coccidia infesting the Rocky Mountain bighorn sheep in Wyoming with a description of two new species.
Wyoming Agri. Expt. Sta. Bull. 249.

Measures occysts in bighorn sheep in Wyoming and compares the numbers to those of domestic sheep. The two new species described are : Eimeria ah-sa-ta and E. crandallis.
Subject: DP1 Area: B Source: ANNB

SH0461

Honess, R.F. and K. Winter. 1956.
Diseases of wildlife in Wyoming.
Wyo. Game and Fish Bull. #9.

This bulletin presented a review of infectious and contagious diseases, noninfectious disease, parasites and parasitic diseases found in wildlife in Wyoming.
Subject: DP1 DP2 Area: B Source: ANNB

SH0143

Howe, D.L., G.T. Woods and G. Marquis. 1966.
Infection of bighorn sheep (Ovis canadensis) with Myoxovirus Parainfluenza-3 and other respiratory viruses.
Wildl. Diseases Assoc. Bull. 2(2):34-40.

Studies infection of bighorn sheep with Myxovirus Parainfluenza-3, and

cytopathogenic effects and hemadsorption in nasal swabs and lung tissue. Tests antibodies of animals against infectious bovine rhinotracheitis virus and human Asian influenza virus. Animals studied came from Wyoming and Montana.
Subject: DP1 RT9 Area: B Source: UABA

SH0145

Hudson, R.J. 1972.
Stress-induced immunologic impairment in Rocky Mountain bighorn sheep.
North. Wild Sheep Counc., Hinton, Alberta. April 11-13, 1972:31-34.

The paper discusses how stress can cause immunological impairment in Rocky Mountain bighorn sheep. The sheep were studied in Jasper National Park.
Subject: DP1 PD3 Area: B

SH0144

Hudson, R.J. 1970.
Immunology of lungworm (Protostrongylus) infections of the Rocky Mountain bighorn sheep.
MSc. Thesis, The Univ. of B.C. Vancouver, British Columbia.

Discusses in detail the immunology of lungworm infections of the Rocky Mountain bighorn sheep in British Columbia. Descriptions of each type of experiment (procedures and results) were outlined.
Subject: DP1 DP2 RT5 Area: A Source: CWSE UBCL

SH0150

Hudson, R.J., W.D. Kitts and P.J. Bandy 1971.
Immunoglobin response of the Rocky Mountain bighorn sheep.
J. Wildl. Diseases 7(2):171-174.

Documents the effects of individual variation, season nd parasite activity on the levels of the four major immunoglobins in Rocky Mountain bighorn ewes taken from the East Kootenay region of British Columbia. The methods used are outlined as well.
Subject: DP1 DP2 RA6 RT5 Area: A Source: UOAL

SH0274

J.G., Stelfox. 1966.
Detailed data on diseased bighorns immobilized, treated and necropsied from the Radium Hot Springs and Jasper herds, Sept. 25 - Nov. 15, 1966.
Can. Wildl. Serv. Edmonton, Alberta.

Documents treatments of diseased bighorn sheep from the Radium Hot Springs and Jasper herds. Condition and health of the animals is described.
Subject: DP1 DP2 PD3 RT5 Area: A Source: CWSE

SH0157

Johnson, R.L. 1973.
Bighorn sheep 1973 - a biological evaluation of the Tucannon bighorn with notes on other Washington sheep.
Washington Dept. of Game.

Study investigates die-offs in the Tucannon bighorn sheep through biological investigation. Gives details of biological examinations with respect to diseases and parasites.

Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0165

Knight, R.A. and L.S. Uhazy. 1973.
Redescription of Trichuris (= Trichocephalus) schumakovitschi (Sarinkova, 1967) from Canadian Rocky Mountain bighorn sheep (Ovis canadensis canadensis).
J. Parasit. 59(1):136-140.

Identifies and redescribes whipworms found in bighorn sheep in the Rocky Mountains, Canada.
Subject: DP1 Area: A Source: UOAL

SH0171

Lance, W.R 1980.
Contagious ecthyma in Rocky Mountain bighorn sheep.
Thesis, Colorado State Univ. Fort Collins, Colorado.

Investigates the epizootiology, morphologic pathology and host range of the contagious ecthyma virus obtained from Rocky Mountain bighorn sheep of the Sagauche herd, south Colorado. Research techniques are discussed in some detail.
Subject: DP1 RT5 Area: B Source: UADZ

SH0172

Lance, W.R. 1980.
The implications of contagious ecthyma in bighorn sheep.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:262-269.

The documented occurrences and clinical signs of contagious ecthyma in the bighorn sheep of North America are reviewed. The significance and possible consequences of this disease upon individual animals, and herd mortality patterns are discussed.
Subject: DP1 Area: B Source: AFWE

SH0176

Lawson, B. and R. Johnson. 1983.
Mountain sheep (Ovis canadensis and Ovis dalli). In Chapman, J.A. and G.A. Feldhamer, eds. Wild mammals of North America - biology, management and economics.
The John Hopkins Univ. Press. Baltimore, Maryland.

Discusses general disribution, physical description, physiology, reproduction, ecology of range, food habits, behavior, mortality factors (including diseases and parasites), a list of gastrointestinal nematodes of wild sheep, age determination, population dynamics and management considerations for thinhorn and bighorn sheep in North America.
Subject: DP1 MA1 NP2 RA1 Area: B Source: AFWE

SH0182

Mahrt, J.L. and D.D. Colwell. 1980.
Sarcocystis in wild ungulates in Alberta.
J. Wildl. Diseases 16(4):571-576.

Documents the incidence of Sarcocystis in wild ungulates in Alberta. The

bighorn sheep came from southeastern Alberta in the Rocky Mountains.
Subject: DP1 Area: B Source: CWSE

SH04621

Marsh, H. 1965.
Newsom's sheep diseases. 3rd ed.
The Williams and Wilkins Company. Baltimore, Maryland.

Outlines many types of sheep diseases and their pathology. Mentions three types of pneumonia found in wild sheep. A good list of references is also included.
Subject: DP1 DP2 Area: C Source: ANNB

SH0196

McCann, L.J. 1953.
Ecology of the mountain sheep.
PhD. Thesis, Univ. of Utah. Salt Lake City, Utah.

The zoogeography, distribution, range conditions, diseases, competition, and social interactions of the genus Ovis in the United States are dicussed.
Subject: RA1 BE1 BE2 DP1 Area: B Source: ANNB

SH0197

McClymont, R.A. 1971.
Parasites of the Rocky Mountain bighorn sheep (Ovis c. canadensis) from national parks in Alberta.
The Dept. Zool., Univ. of Alberta. Edmonton, Alberta.

Various parasites of bighorn sheep in Waterton, Banff and Jasper National Parks are discussed.
Subject: DP1 DP2 Area: B Source: CWSE UOAL

SH0187

Meagher, M. 1982.
An outbreak of pinkeye in bighorn sheep, Yellowstone National Park : a preliminary report.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:198-201.

Documents the incidence of pinkeye caused by Chlamydia sp., in bighorn sheep in Yellowstone National Park, Wyoming. Includes a description of disease and distribution among ewes and rams. States that mortality due to the disease occurred because of impaired foraging and sheltering ability.
Subject: DP1 MF1 Area: B Source: AFWE

SH0192

Morton, J.K. and N. Kingston. 1976.
Further studies on Trypanosomes in game animals in Wyoming.
J. Wildl. Diseases 12(2):233-236.

Discusses Trypanosoma sp. infections in game animals (elk, deer, pronghorn and bighorn sheep) in Wyoming. Blood samples for the analysis were taken from captive ungulates in that area.
Subject: DP1 RT5 Area: B Source: UOAL

SH0193

Moser, C.A. 1962.
The bighorn sheep of Colorado.
Technical Publication #10, Colorado Game and Fish Dept.

The paper is a good overview of the life of Colorado mountain sheep. Three main groups are studied : Dall, Stone and Rocky Mountain bighorn sheep. It gives clinical diagnoses for sheep which were found dead, and studies causes of die-offs in 1885, 1900 and 1923-24. Some methods of research are described.
Subject: DP1 MF1 MA1 PD2 Area: B Source: CWSE

SH0212

Nash, P., G. Post and A. Woolf. 1972.
Preparation and testing of Pasteurella bacterins on captive bighorn sheep.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972: 34-43.

Outlines the techniques used for, and outcomes of testing Rocky Mountain bighorn sheep for Pasteurella bacterins. The study area was Colorado.
Subject: DP1 RT5 Area: B Source: KPNL

SH0204

Neiland, K.A. and C. Dukeminier. 1972.
A bibliography of the parasites, diseases and disorders of several important wild ruminants of the northern hemisphere.
Game Technical Bull. #3, Alaska Dept. Fish and Game.

Lists various publications pertaining to disease and parasites of bighorn sheep and other ruminants.
Subject: BW DP1 DP2 Area: B Source: UADZ ADRI

SH0374

Olsen, O.W. and C.E. White. 1949.
Colorado bighorn sheep, a new host of the sheep pinworm Skrjabinema ovis.
J. Colorado-Wyoming Acad. Sci. 4(1):64-65.

Describes the extent of infection of bighorn sheep in Colorado with the pinworm Skrjabinema ovis.
Subject: DP1 Area: B Source: ANNB

SH0202

Parks, J.B. and J.J. England. 1974.
A serological survey for selected viral infections of Rocky Mountain bighorn sheep.
J. Wildl. Diseases 10(2):107-110.

Study determines viral infections common to Rocky Mountain bighorn sheep in Colorado and Wyoming. The method used was a detection of viral antibodies through serum collection and serological tests.
Subject: DP1 RT5 Area: B Source: UOAL

SH0203

Pearson, N.J. and J.J. England. 1979.
Isolation of a Chlamydial agent from Rocky Mountain bighorn sheep.
J. Wildl. Diseases 15(4):499-503.

Documents isolation of a chlamydial agent from bighorn sheep in Colorado. Techniques used are discussed in some detail. Includes the possible relation of the isolate to the pneumonia complex in these animals.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0214

Pengelly, L. 1970.
The biology and conservation of North American wild sheep.
Msc. Thesis, Univ. of Montana. Missoula, Montana.

Outlines management considerations in light of diseases, mortality factors, population dynamics and behavior, and range quality of six types of wild sheep in North America. The main study area is the United States.
Subject: MA1 DP1 MF1 PD1 Area: B Source: CWSE

SH0218

Pillmore, R.E. 1961.
Investigations of disease and parasites affecting game animals.
Project W-95-R, The State of Colorado Fish and Wildl. Serv. Denver, Colorado.

Studies the lung nematodes of game animals in particular, and includes an investigation of general diseases and parasites affecting these animals. Some techniques were discussed. The study was conducted at the Denver Federal Center and Wildlife Research Laboratories in Colorado.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0219

Pillmore, R.E. 1958.
Investigations of disease and parasites affecting game animals. Study of the lung nematodes of game animals.
The State of Colorado Fish and Wildl. Serv.

Study outlines two research techniques : fecal analysis and snail culture. Also discusses the role of climate in snail infections. Different game animal infections in animals found in Colorado are studied.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0363

Potts, M. 1936.
Sixth annual wildlife report, Rocky Mountain National Park.
On file, Library of Rocky Mountain National Park. Colorado.

Describes the incidence of pneumonia and other diseases of Rocky Mountain bighorn sheep in Rocky Mountain National Park. Gives special reference to diseases inflicting lambs.
Subject: DP1 DP2 MF1 Area: B Source: ANNB

SH0222

Potts, M.K. 1938.
Observations on diseases of bighorn in Rocky Mountain National Park.
Trans. Third North Amer. Wildl. Conf., Baltimore, Maryland. Feb. 14-17, 1938:893-897.

Describes the incidence of disease (especially lungworm) in Rocky Mountain bighorn sheep in Colorado. Descriptions are more qualitative than quantitative.
Subject: DP1 DP2 Area: B Source: UOAL

SH0228

Rich, G.B. 1957.
The ear tick, Otobius megnini (Duges) (Acrina:Argasidae), and its record in British Columbia.
Can. J. Comp. Med. and Vet. Sci. 21(12):415-418.

Documents incidence of ear ticks in a variety of hosts (including mountain sheep), and symptoms of infection. Study area is primarily British Columbia.
Subject: DP1 Area: B Source: UABA

SH0386

Rush, W. 1927.
Notes on diseases in wild game animals.
J. Mammal. 8:163.

The study examines the condition of diseased animals from Sun River Canyon in Montana. Descriptions and identification of the diseases for each animal are included.
Subject: DP1 Area: B Source: ANNB UOAL

SH0234

Samuel, W.M. et al. 1975.
Contagious ecthyma in bighorn sheep and mountain goats of western Canada.
J. Wildl. Diseases 11:26-31.

Detailed outline concerning contagious ecthyma in bighorn sheep and goat in western Canada. Some methodology is included in the report.
Subject: DP1 RT5 Area: A Source: CWSE KPWL

SH0236

Samuel, W.M., W.K. Hall J.G. Stelfox and W.D. Wishart. 1977.
Parasites of mountain goat, Oreamnos americanus (Blainville), of westcentral Alberta with a comparison of helminths of mountain goat and Rocky Mountain bighorn sheep, Ovis c. canadensis Shaw.
Proc. First International Mountain Goat Symp., Kalispell, Montana. Feb. 19, 1977:212-225.

Compares the prevalence and number of parasites in mountain goat to those in Rocky Mountain bighorn sheep. Sheep were taken from various locations throughout Alberta.
Subject: DP1 DP2 RT5 Area: B Source: UADZ

SH0244

Senger, C.M. and D.J. Forrester. 1960.
Experimental infestation of a Rocky Mountain bighorn lamb with Melophagus ovinus (Diptera:Hippoboscidae).
J. Parasit. 46(5):598.

The essay outlines the infection of a bighorn lamb with Melophagus ovinus a parasite of domestic sheep. Because the experiment was successful, management considerations suggested limited contact with domestic sheep.
Subject: DP1 MA1 RT5 Area: C Source: CWSE

SH0283

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Rocky Mountain national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Documents population fluctuations, abundance and distribution, diseases and parasitism, and the ecology of the winter ranges of bighorn sheep in Kootenay, Waterton, Banff and Jasper National Parks.
Subject: PD4 BE2 DP1 RA2 Area: A Source: CWSE

SH0290

Stelfox, J.G. 1974.
Range ecology of bighorn sheep in relation to self - regulation theories.
Can. Wildl. Serv. Edmonton, Alberta.

A study documenting population dynamics of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. When attempting to determine the reasons for fluctuating sheep populations, diseases, parasites and range conditions were studied.
Subject: DP1 RA2 RA4 RA6 Area: A Source: CWSE

SH0282

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Canadian Rocky Mountain national parks, 1966-1971.
Can. Wildl. Serv. Edmonton, Alberta.

Documents die-offs, seasonal distributions, range conditions and diseases and parasites of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Relates these factors to animal conditions, reproduction and mortality.
Subject: PD2 RA1 DP1 MF1 Area: A Source: CWSE

SH0273

Stelfox, J.G. 1966.
Bighorn disease investigation of Graveyard Herd, Jasper Park, November 1 and 2, 1966.
Can. Wildl. Serv. Edmonton, Alberta.

Documents and discusses outbreaks of contagious ecthyma in herds of bighorn sheep in Jasper Park, Alberta. A brief outline of the treatment is also given.
Subject: DP1 Area: B Source: CWSE

SH0294

Stelfox, J.G. 1976.
Diseases and parasites of bighorn sheep in Canadian national parks, 1966 to 1972.
Can. Wildl. Serv. Report to Parks Canada, Western Region. Calgary, Alberta.

Documents the parasites and diseases of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Focuses on the pneumonia-lungworm complex and its role in reducing sheep populations. Particular reference is made to the sheep die-off in Kootenay National Park between 1966 and 1968.
Subject: DP1 DP2 RT5 Area: A Source: KPWL CWSE

SH0277

Stelfox, J.G. 1967.
Bighorn artificial lick problem at Miette Hot Springs, Jasper National Park, May 27 and 28, 1967.
Can. Wildl. Serv. Edmonton, Alberta.

Discusses the relationship of artificial mineral licks to outbreaks of contagious ecthyma in bighorn sheep at Jasper National Park, Alberta.
Subject: DP1 RA6 Area: B Source: CWSE

SH0297

Stelfox, J.G. and J. McGillis. 1970.
Seasonal growth patterns of bighorns correlated with range conditions and endoparasite loads.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970:35-38.

Paper outlines the direct correlation between forage production, ungulate stocking rates, endoparasite loads and overwinter weight losses. The data was obtained from Jasper, Banff, Waterton and Kootenay National Parks.
Subject: DP1 RT4 PD4 Area: A Source: CWSE

SH0467

Stevens, A. 1957.
Respiratory diseases of sheep.
Vet. Rec. 69:1249.

Reviews the respiratory diseases of sheep. Compares Pasteurella multocida, P. hemolytica and P. septica, both biochemically and pathogenically. Discusses further research to be done on vaccines.
Subject: DP1 DP2 RT5 Area: C Source: ANNB

SH0468

Stevenson, R. 1969.
Respiratory diseases of sheep.
Vet. Bull. 39:741-759.

Covers literature on the etiological agents which are associated with sheep pneumonia. Both Rocky Mountain bighorn sheep and domestic sheep were included in the review.
Subject: DP1 DP2 BW Area: B Source: ANNB

SH0308

Streeter, R.G. 1970.
A literature review on bighorn sheep population dynamics.
Special Report #24, Colorado Div. Game, Fish and Parks. Colorado.

Literature concerning the population dynamics of bighorn sheep (Ovis canadensis) is reviewed, synthesized and discussed under categories of population demography, breeding biology, nutrition, diseases and parasites, competition, predation and hunting.
Subject: BW PD1 DP1 MF1 Area: C Source: AFWE

SH0315

Todd, A.W. 1972.
Disease and parasitism in Rocky Mountain bighorn sheep (Ovis c. canadensis) from national parks in Alberta.
Can. Wildl. Serv. Edmonton, Alberta.

Documents occurrence of various diseases and parasites found in the Rocky Mountain bighorn sheep in Jasper, Banff, Kootenay and Waterton Lakes National Parks.
Subject: DP1 DP2 Area: A Source: CWSE

SH0320

Uhazy, L.S. 1969.
Lungworms and other parasites of the Rocky Mountain bighorn sheep.
Unpub. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study which investigates the diseases and parasites of the Rocky Mountain bighorn sheep in the East Kootenay region of British Columbia and southwestern Alberta.
Subject: DP1 DP2 RT5 Area: A Source: CWSE KPNL UADZ

SH0321

Uhazy, L.S. and J.C. Holmes. 1971.
Helminths of the Rocky Mountain bighorn sheep of western Canada.
Can. J. Zool. 49:507-512.

Documents species of helminths, prevalence and intensity, as well as geographical distribution of helminths in the bighorn sheep of Banff, Jasper and Kootenay National Parks.
Subject: DP1 DP2 Area: A Source: CWSE

SH0323

Uhazy, L.S., J.L. Holmes and J.C. Holmes. 1971.
Coccidia of Rocky Mountain bighorn sheep in western Canada.
Can. J. Zool. 49:1461-1464.

Paper outlines the methods and results of a survey of Coccidia in the Rocky Mountain bighorn sheep. The study area is western Canada - Alberta and Kootenay National Park, British Columbia.
Subject: DP1 RT5 Area: A Source: CWSE UOAL

SH0332

Williams, E.S. and T.R.Spraker. 1979.
Paratuberculosis (Johne's disease) in bighorn sheep and a Rocky Mountain goat in Colorado.
J. Wildl. Diseases 15(2):221-227.

Discusses Paratuberculosis infections in Rocky Mountain bighorn sheep in Colorado on Mt. Evans. Includes techniques of analysis, as well as general physical symptoms of the disease.
Subject: DP1 RT5 Area: B Source: CWSE

SH0331

Williams, E.S. and C.P. Hibler. 1982.
Survey of Colorado and Wyoming bighorn sheep and mountain goats Paratuberculosis.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:173-187.

Discusses incidence of Paratuberculosis (Johne's Disease) in bighorn sheep and mountain goats in Wyoming and Colorado. The lymphocyte blastogenesis test was used in this study, as well as blood and fecal samples. The techniques are described in detail.
Subject: DP1 RT5 Area: B Source: AFWE

SH0333

Williams, E.S., G.G. Schoonveld T.R. Spraker and C.P. Hibler. 1978.
Paratuberculosis (Johne's disease) in bighorn sheep (Ovis canadensis) and Rocky Mountain goats (Oreamnos americanus) in Colorado.
Proc. 1978 North. Wild Sheep and Goat Conf., Penticton, B.C. 1978:248-261.

Clinical signs, transmission of, and techniques for testing and identifying Johne's Disease in mountain goats and bighorn sheep are discussed. Included is the importance of finding this disease in free-ranging animals.
Subject: DP1 Area: B Source: AFWE

SH0343

Wishart, W.D. 1980.
Bighorn sheep. In Big game of North America, ecology and management. pp 161-171. J.L. Schmidt and D.L. Gilbert, eds.
Stackpole Books. Harrisburg, Pennsylvania.

Discusses the general physical description, population dynamics, food habits, diseases and parasites, competition, predation and various management consideraions (harvesting, populations and habitat) of the four species of bighorn sheep inhabiting North America.
Subject: PD1 DP1 BE1 MF1 Area: B Source: AFWE

SH0347

Wood, J.E. 1960.
A bibliography of bighorn sheep.
Trans. Desert Bighorn Counc. 4:101-111.

The 180 references were divided into ecology and management, inventories and hunting records, general references to taxonomy, geographic areas, distribution, predation, parasites and diseases, reproduction and miscellaneous notes, techniques and popular articles of a general nature.

Subject: BW MA1 BE2 DP1 Area: C Source: ANNB

SH0348

Woodward, T., C. Hibler and B. Rutherford. 1972.
Bighorn lamb mortality investigations in Colorado.
Trans. 1972 North. Wild Sheep and Goat Counc., Hinton, Alberta. April 11-13, 1972:44-48.

Investigates bighorn sheep lamb mortality in Colorado. Causes are mostly related to disease, especially the pneumonia-lungworm complex.
Subject: MF1 DP1 DP2 Area: B Source: AFWE

SH0352

Woolf, A. and D.C. Kradel. 1973.
Mortality in captive bighorn sheep - clinical, hematological, and pathological observations.
J. Wildl. Diseases 9(1):12-17.

Documents the clinical, hematological and pathological findings in captive bighorn sheep in Pennsylvania. Also discusses whether or not blood analysis had prognostic value and could be used to detect the presence of subclinical disease. In addition, possible etiologic agents involved in the lung disease complex were investigated.
Subject: DP1 DP2 RT5 RT9 Area: B Source: UOAL

SH0353

Woolf, A, D.C. Kradel and G.R. Bubash. 1970.
Mycoplasma isolates from pneumonia in captive Rocky Mountain bighorn sheep.
J. Wildl. Diseases 6:169,170.

Documents bacterial isolates from bighorn sheep and discusses the results. No study area was stated.
Subject: DP1 DP2 Area: B Source: CWSE

SH0500

Worley, D.E. and R.E. Barrett 1980.
Hosts and distibution of Capillaria bovis (Shnyder, 1906) in domestic and wild ruminants in northwestern United States.
J. Parasitology 66(4):695-696.

Documents the hosts and distibutions of the ruminant intestinal capillarid , C. bovis (Shnyder, 1906) in wild ruminants in the northwesern U.S.A.
Subject: DP1 Area: B Source: ADRI

PNEUMONIA-LUNGWORM (DP2)

SH0004

Allen, R.W. 1964.
Additional notes on the parasites of bighorn sheep on the Desert Game Ranch, Nevada.
Trans. Desert Bighorn Counc., Mexico. April 7-9, 1964:5-9.

Documents the incidence of Protostrongylus stilesi and Trichuris discolor in bighorn sheep on the Desert Game Ranch, Nevada.
Subject: DP1 DP2 Area: B Source: UOAL

SH0365

Allen, R.W. and H.G. Erling. 1964.
Parasites of bighorn sheep and mule deer in Arizona with new host records.
J. Parasit. 50(3):38.

Note was made of new parasites found on mule deer and parasites found on or in twelve bighorn sheep in Arizona.
Subject: DP1 DP2 Area: B Source: ANNB

SH0008

Anonymous. 1970.
Pneumonia in Rocky Mountain bighorn sheep.
Progress Report for the Rachelwood Wildlife Preserve. New Florence, Pennsylvania.

Outlines an investigation into two types of pneumonia in bighorn sheep at the Rachelwood Wildlife Preserve and Colorado State Univ. Some techniques are discussed. The two pneumonia types studied are: Protostrongylus stilesi and Pasteurella.
Subject: DP2 RT5 Area: B Source: CWSE

SH0012

Bandy, P.J. 1966.
Bighorn sheep die-off in British Columbia : a complex of environmental factors. Ottawa, Canada.
The 1966 Annual Meeting of the Can. Soc. of Wildl. and Fishery Biologists January 4, 1966.

This paper discusses the relation of environmental factors to bighorn sheep population dynamics (particularly die-offs) in British Columbia.
Subject: DP2 PD2 Area: A Source: CWSE

SH0018

Becklund, W.W. and C.M. Senger. 1967.
Parasites of Ovis canadensis canadensis in Montana, with a checklist of the internal and external parasites of the Rocky Mountain bighorn sheep in North America.
J. Parasitology 53(1):157-165.

Documents the incidence of parasites in Rocky Mountain bighorn sheep on the National Bison Range, Wild Horse Island and the Sun River area of Montana. Included is an extensive list of parasites of bighorn sheep and their distribution throughout North America.
Subject: DP1 DP2 Area: B Source: UOAL

SH0024

Block, D.W. 1970.
Lungworms of mountain goats in the Black Hills of South Dakota.
Thesis, South Dakota State Univ. South Dakota.

The paper centers primarily on mountain goat lungworms, but a detailed discussion of the life cycle, intermediate hosts and transmission of the Protostrongylid parasites is included.
Subject: DP2 Area: C Source: UADZ

SH0029

Boag, D.A. and W.D. Wishart. 1982.
Distribution and abundance of terrestrial gastropods on a winter range of bighorn sheep in southwestern Alberta.
Can. J. Zool. 60:2633-2640.

Documents distribution and abundance of terrestrial gastropods on the winter ranges of bighorn sheep at the Sheep River drainage, Alberta. Some research techniques are included. The results are discussed in relation to transmission of lungworm.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0361

Bond, R.M. 1936.
Special report on bighorn sickness in Glacier National Park.
U.S. National Park Serv. Glacier National Park Files.

Documents the incidence of pneumonia and other diseases in bighorn sheep at Glacier National Park. Descriptions of the lung condition in dead animals was outlined.
Subject: DP1 DP2 PD5 Area: B Source: ANNB

SH0032

Brown, G.W. 1974.
Distribution and population characteristics of bighorn sheep near Thompson Falls in northwestern Montana.
MSc. Thesis, The Univ. of Montana. Missoula, Montana.

Outlines distribution, population dynamics, general behavior and diseases of bighorn sheep near Thompson Falls, northwestern Montana. Included are research techniques used in obtaining the data.
Subject: RT6 BE2 NP2 DP2 Area: B Source: CWSE

SH0038

Carter, G. and R. Bain. 1960.
Pasteurellosis (Pasteurella multocida) - a review stressing recent development.
Vet. Rev. and Annot. 6(2):105-128.

A comprehensive review of pasteurellosis caused by Pasteurella multocida is given. Bacterial morphology, distribution, variation, biochemistry, etc. of research done in these fields as well as pathology are discussed. Types A,B and D have been isolated from sheep with 13 types untypeable. A list of references is included.
Subject: DP1 DP2 Area: C Source: ANNB

SH0047

Cooley, T.M. 1976.
Lungworms in mountain goats.
MSc. Thesis, Colorado State Univ. PP = Fort Collins, Colorado.

Discusses lungworm infection in mountain goats as well as in bighorn sheep. Gives detailed biology of the lifecycle of lungworms, including pathogenesis and pathology. Techniques are discussed in detail.
Subject: DP2 RT5 Area: B Source: UADZ

SH0054

Cowan, I.McT. 1951.
The diseases and parasites of big game mammals of western Canada.
Report of Proc. of the Fifth Annual Game Convention, Vancouver, Canada. April 25-28, 1951:37-64.

Documents in detail the diseases and parasites affecting game mammals of western Canada. Most data is taken from a survey of 121 big game animals (including 13 bighorn sheep). Each external and internal parasite of the host is listed and discussed.
Subject: DP1 DP2 Area: A Source: KPNL

SH0493

Cowan, I.McT. 1944.
Parasites, diseases and injuries of game animals in Banff, Jasper and Kootenay National Parks.
National Parks Bureau. Ottawa, Canada.

Documents incidence of parasites, diseases and injuries of game animals in Banff, Jasper and Kootenay National Parks during 1944.
Subject: DP1 DP2 RT5 Area: A Source: WNPL

SH0455

Davis, J.W., L. Karstad and eds. D.O. Trainer 1970.
Infectious diseases of wild mammals.
Iowa State Univ. Ames, Iowa.

Gives general descriptions of various diseases of wild mammals. Bighorn sheep were described as being susceptible to actinomycosis, anaplasmosis, bluetongue disease, and foot rot. Discusses Pasteurellosis as part of the lungworm-pneumonia complex which affects sheep.
Subject: DP1 DP2 Area: B Source: ANNB

SH0066

Demarchi, R. and P. Davidson. 1982.
East Kootenay bighorn sheep habitat enhancement.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A report dealing with management techniques designed to preserve and increase the population of Rocky Mountain bighorn sheep. Included is specific data on range conditions, the pneumonia-lungworm disease and various research techniques.
Subject: MA2 RA2 RA3 DP2 Area: A Source: CWSE

SH0070

DeMartini, J.C. and R.B. Davies. 1977.
An epizootic of pneumonia in captive bighorn sheep infected with Muellerius sp.
J. Wildl. Diseases 13(2):117-124.

Documents incidence of disease (Muellerius spp. in particular) in captive Rocky Mountain bighorn sheep in Colorado. Results are obtained through a series of isolations of viruses and bacteria.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0069

DeMartini, J.C. and R.B. Davies. 1976.
Muellerius capillaris associated pneumonia in captive bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:117-124.

This report describes the course of an epizootic of pneumonia in 20 captive bighorn sheep as well as etiologic and pathologic features of the disease process. Psychological stress is suggested as an underlying factor.
Subject: DP2 Area: B Source: AFWE

SH0071

Dikmans, G. 1931.
Two new lungworms from North American ruminants and a note on the lungworms of sheep in the United States.
Proc. of the U.S. National Museum 79(18):1-4.

Incidence of Protostrongylus stilesi in sheep in Colorado is documented. A provisional key to the species of Protostrongylus is also given.
Subject: DP2 Area: B Source: UABA

SH0072

Dikmans, G. 1935.
A note on Protostrongylus stilesi (Nematoda:metastrongylidae) from the mountain sheep, Ovis canadensis, in Yellowstone National Park, Wyoming.
Proc. of the Helminth. Soc. Washington 2(2):84.

Documents the incidence of Protostrongylus stilesi in Yellowstone National Park, Wyoming. The physical description of recovered specimens is given.
Subject: DP2 Area: B Source: UABA

SH0369

Dikmans, G. 1943.
The lungworm Protostrongylus rushi Dikmans, 1937, of the mountain sheep Ovis canadensis.
Proc. Helminth. Soc. Washington 10(1):8-9.

Outlines the physical description of the lungworm Protostrongylus rushi as found in bighorn sheep. Drawings are included, as well as description of locations found.
Subject: DP2 Area: B Source: ANNB

SH0456

Dungal, N., G. Gislason and E. Taylor. 1938.
Epizootic Adenomatoses in the lungs of sheep comparisons with Jaagsiekte, verminous pneumonia, and progressive pneumonia.
J. Comp. Path. and Ther. 51:46-52.

Compares the lungs of bighorn sheep which died from various types of pneumonia. Looks at the symptoms of each type of pneumonia, and investigates the cause and extent of the diseases.
Subject: DP2 Area: C Source: ANNB

SH0457

Durbin, C.G. 1951.
Lungworm infection in sheep.
Proc. Amer. Vet. Med. Assoc. 88:116-118.

Larvae and adults of three genera of lungworms were differentially described (Dictyocaulus, Muellerius and Protostrongylus). Control measures were discussed.
Subject: DP2 MA3 Area: C Source: ANNB

SH0075

Ellenberger, J.H. 1976.
The epitzoology of Protostrongylus in a Poudre River bighorn sheep herd.
Proc. Biennial Symp. of the North. Wild Sheep Coun., Jackson, Wyoming. Feb. 10-12, 1976:89-94.

Documents (1) larval output of Protostrongylus spp. in fecal pellets of sheep (2) identification of snail intermediate hosts, densities of snails, and extent of infection in snails and (3) the lamb survival of the study herd.
Subject: DP2 Area: B Source: AFWE

SH0371

Emerson, K.C. 1962.
A new species of Mallophaga from the bighorn sheep.
J. Kansas Entomol. Soc. 35:369-370.

Bovicola jellisoni n. sp. was described with measurements and illustrations.
Subject: DP2 Area: B Source: ANNB

SH0083

Festa-Bianchet, M. 1983.
Report on a bighorn sheep - lungworm study at Sheep River, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

A detailed study of Rocky Mountain bighorn sheep at Sheep River, Alberta. Documents population dynamics, behavior and lungworm infection of this band.
Subject: PD2 DP2 RT6 BE2 Area: B Source: CWSE

SH0084

Foreyt, B. and R. Johnson. 1980.
Treatment for lungworms (Protostrongylus spp.) in Rocky Mountain bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:248-261.

Discusses the results of albendazole treatment of Rocky Mountain bighorn sheep with lungworms (Protostrongylus spp.). Methods are discussed in detail. The sheep were taken from Wildhorse Island, Montana.
Subject: DP2 RT5 Area: B Source: AFWE

SH0085

Forrester, D.J. 1960.
A preliminary investigation of the protostrongylin lungworm-bighorn sheep relationships in Montana.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

Studies the physiology of Protostrongylus through dessication, freezing, and phototropism experiments. Experimentally infected snails with lungworm larvae. Documents prenatal infection of lambs, and incidence of lungworms in hunter-killed bighorns. Found possible intermediate host snails on all ranges examined.
Subject: DP2 Area: B Source: UABA

SH0480

Forrester, D.J. 1971.
Bighorn sheep lungworm-pneumonia complex. In Animals, J.W. Davis and R.C. Anderson, eds.
Iowa State Univ. Press. Ames, Iowa.
Subject: DP2 Area: B Source: CWSE

SH0086

Forrester, D.J. 1962.
Land mollusca as possible intermediate hosts of Protostrongylus stilesi, a lungworm of bighorn sheep.
Proc. Montana Acad. of Sciences 22:82-92.

Documents the capability of land mollusca to serve as intermediate hosts of Protostrongylus stilesi. The study was conducted in western Montana.
Subject: DP2 RT5 Area: B Source: CWSE

SH0383

Forrester, D.J.
The bighorn sheep lungworm - pneumonia complex.
Ms submitted to Wildlife Diseases book to be edited by John Davis.

Describes the involvement of nematodes (Protostrongylus stilesi, P. rushi, P. frosti), bacteria (Coynrbacterium, Pasteurella), and viruses (PI-3) in the lungworm-pneumonia complex of bighorn sheep. Discusses conditions favorable for starting an outbreak of the disease.
Subject: DP2 RT9 Area: B Source: ANNB

SH0093

Forrester, D.J. and C.M. Senger. 1964.
Prenatal infection of bighorn sheep with protostrongylid lungworms.
Nature 201(4923):1051.

Determines whether prenatal infection of bighorn sheep (Ovis c. canadensis) with protostrongylid lungworms is a form of population control. The study was conducted in Montana.
Subject: DP2 PD2 Area: B Source: CWSE

SH0090

Forrester, D.J. and C.M. Senger. 1963.
Effect of temperature and humidity on survival of first stage Protostrongylus stilesi larvae.
Exp. Parasit. 13(2):83-89.

Investigates the effect of humidity and temperature in natural situations on the survival of first stage Protostrongylus stilesi larvae to determine the significance upon the infection of snails on a range used by infected bighorn sheep.
Subject: DP2 Area: B Source: UABA

SH0092

Forrester, D.J. and C.M. Senger. 1964.
A survey of lungworm infection in bighorn sheep of Montana.
J. Wildl. Manage. 28(3):481-491.

Study documents the investigation of lungworm as a cause of the declining numbers of the Rocky Mountain bighorn sheep in Montana. Methods of fecal and lung analysis are described.
Subject: DP2 RT5 Area: B Source: CWSE

SH0091

Forrester, D.J. and C.M. Senger. 1963.
Bighorns and lungworm.
Montana Wildl. April, 1963:2-7.

Examines the sheep population die-offs in the 1900's, and investigates the role of the lungworm in the declining numbers.
Subject: DP2 PD2 Area: B Source: CWSE

SH0089

Forrester, D.J. and R.C. Littell. 1976.
Influence of rainfall on lungworm infections in bighorn sheep.
J. Wildl. Diseases 12:48-51.

Discusses the correlation between rainfall and the level of infection with lungworm in bighorn sheep. Data was obtained from ten herds of sheep in western Montana.
Subject: DP2 Area: B Source: CWSE

SH0101

Gates, C.C. 1975.
Aspects of the environment - lungworm (Nematode:metastrongyloidea) - bighorn sheep (Ovis c. canadensis) system.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Discusses the role of nutrition and other environmental factors (especially climate) in lungworm infections in Rocky Mountain bighorn sheep. The study area was the Red Deer River valley, Alberta.
Subject: DP2 RA6 RT5 Area: B Source: UADZ

SH0102

Gates, C.C. and W.M. Samuel. 1977.
Prenatal infection of the Rocky Mountain bighorn sheep (Ovis c. canadensis) of Alberta with the lungworm Protostrongylus spp.
J. Wildl. Diseases 13(3):248-250.

Documents infections of young bighorn sheep lambs with Protostrongylus spp. The sheep were taken from Jasper National Park, and the Sheep River area in southwestern Alberta.
Subject: DP2 Area: B Source: CWSE

SH0458

Hall, M.C. 1931.
Parasite control in wild animals..
Outdoor America July:16-17, 46.

Covers various specific problems of parasites in wild animals, including the lungworms of bighorn sheep. Some reasons were outlined as contributing to the susceptibility of the sheep to this disease.
Subject: DP2 MA3 RT5 Area: B Source: ANNB

SH0459

Hamdy, A. and V. Songer. 1959.
Characteristics of a virus associated with lamb pneumonia.
Amer. J. Vet. Res. 20:84-86.

This investigation was designed to obtain additional information on the virus agent isolated from pneumonic domestic lambs. The virus was isolated and propogated in tissue cultures, then tested in various animals. A list of references was also given.
Subject: DP2 RT5 Area: B Source: ANNB

SH0362

Harrington, F. 1969.
Pasteurellosis in bighorn sheep.
Dept. of Fishery and Wildl. Biology. Colorado State University, Fort Collins, Colorado.

A necropsy report dealing with infection of bighorn sheep in Colorado with pneumonia.
Subject: DP2 Area: B Source: ANNB

SH0130

Hibler, C.P. 1974.
Further observations on Protostrongylus sp. infection by transplacental transmission in bighorn sheep.
J. Wildl. Diseases 10(1):39-41.

Documents 6 cases of natural Protostrongylus sp. infection occurring in bighorn sheep by the transplacental route. The study area was Pike's Peak in Colorado.
Subject: DP2 Area: B Source: CWSE

SH0131

Hibler, C.P. and T. Spraker. 1976.
Treatment of bighorn sheep for lungworm.
Proc. Biennial Symp. of the North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:35-39.

Studies the treatment of lungworm in bighorn sheep with four drugs, Tramisol, Cambendazole, Thiabenzadole and Dichlorvos. Methods and results are outlined. Study area is Colorado.
Subject: DP2 Area: B Source: AFWE

SH0137

Holmes, J.C. and W.M. Samuel. 1974.
Surveillance study of the parasites of bighorn sheep in the mountain national parks.
Dept. of Zoology, The Univ. of Alberta. Edmonton, Alberta.

Studies the relation between infection of parasites in bighorn sheep and the history of population die-offs. Documents sampling and evaluation of health of individual herds from Jasper, Kootenay and Waterton National Parks. Some techniques are discussed.
Subject: DP2 RT5 PD2 Area: A Source: KPWL KPNL

SH0136

Holmes, J.C., J.L. Mahrt and W.M. Samuel. 1973.
Proposal for a surveillance study to monitor the lungworms and gastro-intestinal parasites of bighorn sheep in the mountain national parks, 1972 and 1973.
Dept. of Zoology, The Univ. of Alberta. Edmonton, Alberta.

Outlines techniques used to monitor the lungworms and parasite burdens of bighorn sheep in Jasper, Kootenay, Waterton and Banff National Parks. Includes a plan of sampling schedule and procedures, and describes laboratory analysis.
Subject: RT5 DP2 Area: A Source: KPWL

SH0372

Honess, R.F. 1942.
Lungworms of domestic sheep and bighorn sheep.
Univ. of Wyoming Agri. Expt. Sta. Bull. 255:1-24.

The description of Protostrongylus rushi was amended in this publication. P. frosti was described as a new species from bighorn sheep. P. stilesi was not known in Wyoming bighorn sheep at the time.
Subject: DP2 Area: B

SH0460

Honess, R.F. 1942.
Lungworms of domestic sheep and bighorn sheep in Wyoming.
Univ. Wyoming Agri. Expt. Stn. Bull. 255.

Documents incidence of lungworm in bighorn sheep in Wyoming. Includes a discussion of the pathogenicity of the lungworms.
Subject: DP2 Area: B Source: ANNB

SH0461

Honess, R.F. and K. Winter. 1956.
Diseases of wildlife in Wyoming.
Wyo. Game and Fish Bull. #9.

This bulletin presented a review of infectious and contagious diseases, noninfectious disease, parasites and parasitic diseases found in wildlife in Wyoming.
Subject: DP1 DP2 Area: B Source: ANNB

SH0138

Honess, R.F. and N.M. Frost. 1942.
A Wyoming bighorn sheep study.
Wyoming Fish and Game Dept. Bulletin #1.

Studied population size and distributions of bighorn sheep in Wyoming. Decimation factors were considered. Some suggested factors were insufficient and deficient winter forage, and contagious ecthyma in lambs and adults. Recommendations for supplemental feeding were made.
Subject: BE2 DP2 MA3 RA2 Area: B Source: ANNB

SH0144

Hudson, R.J. 1970.
Immunology of lungworm (Protostrongylus) infections of the Rocky Mountain bighorn sheep.
MSc. Thesis, The Univ. of B.C. Vancouver, British Columbia.

Discusses in detail the immunology of lungworm infections of the Rocky Mountain bighorn sheep in British Columbia. Descriptions of each type of experiment (procedures and results) were outlined.
Subject: DP1 DP2 RT5 Area: A Source: CWSE UBCL

SH0146

Hudson, R.J. 1973.
Stress and in vitro lymphocyte stimulation by Phytohemagglutin in Rocky Mountain bighorn sheep.
Can. J. Zool. 51(5) : 479-482.

Relates various types of stress to the pneumonic diseases of the Rocky Mountain bighorn sheep. Tested changes in in vitro lymphocyte response as a measure of stress. The study area was Jasper National Park, Alberta.
Subject: DP2 PD3 Area: A Source: UOAL

SH0147

Hudson, R.J. 1975.
Lymphoid cell adherence in Protostrongylus (Nematoda : metastrongyloidea) infections of Rocky Mountain bighorn sheep.
Can. J. Zool. 53(4):391-394.

Discusses the mediation and blocking of lymphoid cell adherence in Protostrongylus infections of bighorn sheep from Canada's national parks.
Subject: DP2 Area: A Source: CWSE

SH0152

Hudson, R.J. and J.G. Stelfox. 1976.
Populations and diseases of bighorn sheep of the Canadian Rockies : a systems dynamics approach.
Can. Wildl. Serv. Edmonton, Alberta.

Data was based on longterm studies of range ecology, parasitism and population dynamics. Areas of study included Jasper, Banff and Waterton National Parks. The paper analyzed a system dynamics approach to the problem of sheep die-offs in the Canadian Rockies.
Subject: PD1 PD2 DP2 RA1 Area: A Source: CWSE

SH0149

Hudson, R.J., W.D. Kitts and P.J. Bandy. 1970.
Monitoring parasite activity and disease in the Rocky Mountain bighorn by electrophoresis of seromucoids.
J. Wildl. Diseases 6:104-106.

Documents the measurement of host-parasite interaction between Rocky Mountain bighorn sheep and the lungworm parasite Protostrongylus stilesi. The method used is electrophoresis of seromucoids.
Subject: DP2 RT5 RT9 Area: A Source: CWSE

SH0150

Hudson, R.J., W.D. Kitts and P.J. Bandy 1971.
Immunoglobin response of the Rocky Mountain bighorn sheep.
J. Wildl. Diseases 7(2):171-174.

Documents the effects of individual variation, season nd parasite activity on the levels of the four major immunoglobins in Rocky Mountain bighorn ewes taken from the East Kootenay region of British Columbia. The methods used are outlined as well.
Subject: DP1 DP2 RA6 RT5 Area: A Source: UOAL

SH0154

Hunter, G.N. and R.E. Pillmore. 1954.
Hunting as a technique in studying lungworm infestations in bighorn sheep.
Trans. Nineteenth North Amer. Wildl. Conf. March 8-10, 1954:116-131.

Investigates the possibility of using hunting as a technique in studying lungworm in Rocky Mountain bighorn sheep. Documents a study done using this method.
Subject: DP2 RT5 MF4 Area: B Source: CWSE

SH0274

J.G., Stelfox. 1966.
Detailed data on diseased bighorns immobilized, treated and necropsied from the Radium Hot Springs and Jasper herds, Sept. 25 - Nov. 15, 1966.
Can. Wildl. Serv. Edmonton, Alberta.

Documents treatments of diseased bighorn sheep from the Radium Hot Springs and Jasper herds. Condition and health of the animals is described.
Subject: DP1 DP2 PD3 RT5 Area: A Source: CWSE

SH0157

Johnson, R.L. 1973.
Bighorn sheep 1973 - a biological evaluation of the Tucannon bighorn with notes on other Washington sheep.
Washington Dept. of Game.

Study investigates die-offs in the Tucannon bighorn sheep through biological investigation. Gives details of biological examinations with respect to diseases and parasites.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0161

Jorgenson, J.T. 1979.
A survey of lungworm larvae in certain bighorn sheep herds from the Rocky Mountains, 1978-79.
Dept. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents the incidence of lungworm larvae in bighorn sheep herds in Waterton, Kootenay and Banff National Parks, as well as some herds outside the parks.
Subject: DP2 Area: A Source: KPWL

SH0164

Kerr, G.R. 1966.
Goat and sheep range distribution.
Alta. Dept. Lands and Forests Project W-1-65. Edmonton, Alberta.

The objectives of the survey were : (1) to determine current location and extent of Rocky Mountain goat and bighorn sheep ranges, (2) to classify ranges according to primary seasonal use and to delineate key areas, and (3) to map seasonal ranges. The survey included mountainous regions within the boundaries of either the Crowsnest or Bow River Forest Reserves. Details of vegetation, utilization and animal inhabitants are outlined for each numbered grazing allotment.
Subject: RA5 DP2 BE2 BE3 Area: B Source: AFWE

SH0173

Lange, R.E. Jr. 1973.
Epidemiology of lungworms (Protostrongylus stilesi and rushi) in Rocky Mountain bighorn sheep (Ovis c. canadensis).
Thesis, Colorado State Univ. Fort Collins, Colorado.

Investigates the completion and epidemiology of the lungworm life cycle. Methodology is discussed quite extensively. Study was conducted on Rocky Mountain bighorn sheep near Meeker, Colorado.
Subject: DP2 RT5 Area: B Source: UADZ

SH0174

Latson, F.E. III. 1977.
The distribution and ecology of intermediate host snails of Protostrongylus spp. lungworms of bighorn sheep on Pike's Peak, Colorado.
Thesis, Colorado State Univ. Fort Collins, Colorado.

Studies the distribution of snails suitable as intermediate hosts for Protostrongylus spp. lungworm of bighorn sheep, Ovis canadensis. The ecology

of the host snails and the life cycle of the parasite is also discussed. The study area is Pike's Peak, Colorado.
Subject: DP2 RT5 Area: B Source: UADZ

SH0183

Marquardt, W.C. and C.M. Senger. 1956.
Lungworms in the bighorn sheep of Montana.
Proc. Helminth. Soc. Washington 23(1):68-69.

The incidence of lungworm infection in bighorn sheep in Montana was discussed. Both Protostrongylus rushi and P. stilesi were discovered when the animals were examined during the 1954 hunting season.
Subject: DP2 Area: B Source: UABA

SH0184

Marsh, H. 1938.
Pneumonia in Rocky Mountain bighorn sheep.
J. Mammal. 19(2):214-219.

Discusses the symptoms, pathology and parasitology of pneumonia in Rocky Mountain bighorn sheep in Montana. Includes a section on Pasteurellosis in lambs. Investigates losses of bighorn sheep in Glacier and Yellowstone National Parks and the National Bison Range. Discusses lungworm as a primary etiological factor, with secondary bacterial invasion occurring during crowded winter grazing.
Subject: DP2 Area: B Source: CWSE

SH04621

Marsh, H. 1965.
Newsom's sheep diseases. 3rd ed.
The Williams and Wilkins Company. Baltimore, Maryland.

Outlines many types of sheep diseases and their pathology. Mentions three types of pneumonia found in wild sheep. A good list of references is also included.
Subject: DP1 DP2 Area: C Source: ANNB

SH0463

Marsh, H. 1953.
The role of Pasteurella in sheep diseases.
J. Amer. Vet. Med. Assoc. 123:205-208.

Describes in detail the role of Pasteurella in bighorn sheep diseases. A short literature review is given as well.
Subject: DP2 Area: B Source: ANNB

SH0197

McClymont, R.A. 1971.
Parasites of the Rocky Mountain bighorn sheep (Ovis c. canadensis) from national parks in Alberta.
The Dept. Zool., Univ. of Alberta. Edmonton, Alberta.

Various parasites of bighorn sheep in Waterton, Banff and Jasper National Parks are discussed.
Subject: DP1 DP2 Area: B Source: CWSE UOAL

SH0189

Mills, H. 1937.
A preliminary study of the bighorn of Yellowstone National Park.
J. Mammal. 18(2):205-212.

Discusses bacterial pneumonia as the cause of a bighorn sheep die-off in Yellowstone National Park. Also looks into other adverse factors affecting the sheep populations in that area.
Subject: DP2 Area: B Source: ANNB UOAL

SH0190

Monson, R.A. and G. Post. 1972.
Experimental transmission of Protostrongylus stilesi to bighorn-mouflon sheep hybrids.
J. Parasit. 58(1):29-33.

Investigates the life cycle of Protostrongylus stilesi by transmission of the infective larvae from the intermediate host to the definitive host. Definitive hosts were mouflon-bighorn sheep hybrids (Ovis musimon, Ovis c. canadensis). Techniques used are described in detail.
Subject: DP2 RT5 Area: C Source: UOAL

SH0204

Neiland, K.A. and C. Dukeminier. 1972.
A bibliography of the parasites, diseases and disorders of several important wild ruminants of the northern hemisphere.
Game Technical Bull. #3, Alaska Dept. Fish and Game.

Lists various publications pertaining to disease and parasites of bighorn sheep and other ruminants.
Subject: BW DP1 DP2 Area: B Source: UADZ ADRI

SH0207

Ogren, H.A. 1954.
A population study of the Rocky Mountain bighorn sheep (Ovis canadensis canadensis Shaw) on Wildhorse Island.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

Documents population changes and distributions over four years of study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The success and failure of various techniques of marking are dicussed. Diseases and parasites affecting the animals are outlined as well, and related to mortality.
Subject: PD1 MF1 DP2 RT7 Area: B Source: ANNB

SH0203

Pearson, N.J. and J.J. England. 1979.
Isolation of a Chlamydial agent from Rocky Mountain bighorn sheep.
J. Wildl. Diseases 15(4):499-503.

Documents isolation of a chlamydial agent from bighorn sheep in Colorado. Techniques used are discussed in some detail. Includes the possible relation of the isolate to the pneumonia complex in these animals.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0380

Pillmore, R.E. 1957.
Lungworm and its relationship to bighorn sheep management.
Proc. Annual Conf. of Western Assoc. of State Game and Fish Comm. 37 :198-205.

Discusses the lifecycle of the lungworm, and how factors such as population density of sheep and snails, livestock use, trapping and transplanting and feeding minerals have an effect on the transmission of lungworm.
Subject: DP2 MA1 Area: B Source: ANNB

SH0378

Pillmore, R.E. 1958.
Problems of lungworm infection in wild sheep.
Trans. Desert Bighorn Counc. 2:57-63.

Discusses Protostrongylus stilesi as a cause of the disease-caused population declines of Colorado's bighorn sheep herds.
Subject: DP2 Area: B Source: ANNB UOAL

SH0377

Pillmore, R.E. 1959.
Lungworm and lambs.
Outdoor Facts No. 13, Colorado Game, Fish and Parks Game Information Leaflet.

Investigates the causes of lamb mortality in the Sangre de Cristo Mountains, Colorado. Prenatal Protostrongylus infection was suspected to be the cause of the high mortality rate.
Subject: DP2 Area: B Source: ANNB

SH0217

Pillmore, R.E. 1954.
Report on the bighorn.
Colorado Conservation 3(1):19-21.

Discusses the hunting season with respect to (1) relief of concentrations of bighorn sheep apparently responsible for a lungworm epidemic, and (2) removal of surplus rams for a more favorable sex ratio. Includes documented incidence of lungworm. The study area is Colorado.
Subject: DP2 MA3 MF4 Area: B Source: UABA

SH0218

Pillmore, R.E. 1961.
Investigations of disease and parasites affecting game animals.
Project W-95-R, The State of Colorado Fish and Wildl. Serv. Denver, Colorado.

Studies the lung nematodes of game animals in particular, and includes an investigation of general diseases and parasites affecting these animals. Some techniques were discussed. The study was conducted at the Denver Federal Center and Wildlife Research Laboratories in Colorado.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0219

Pillmore, R.E. 1958.
Investigations of disease and parasites affecting game animals. Study of the lung nematodes of game animals.
The State of Colorado Fish and Wildl. Serv.

Study outlines two research techniques : fecal analysis and snail culture. Also discusses the role of climate in snail infections. Different game animal infections in animals found in Colorado are studied.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0376

Pillmore, R.E. 1959.
The evidence for the prenatal lungworm infection of bighorn lambs.
J. Colorado-Wyoming Acad. Sci. 4(11):61.

Gives evidence for prenatal infection of bighorn lambs in Colorado with lungworm.
Subject: DP2 Area: B Source: ANNB

SH0375

Pillmore, R.E. 1959.
The known distribution of lungworm (Protostrongylus) infection in Colorado.
J. Colorado-Wyoming Acad. Sci. 4(11):60.

Outlines the distribution of Protostrongylus infection in bighorn sheep in Colorado.
Subject: DP2 Area: B Source: ANNB

SH0379

Pillmore, R.E. 1958.
Lungworm in bighorn sheep.
Outdoor Facts No. 10, Colorado Game, Fish and Parks Game Information Leaflet.

Outlines the theoretical lifecycle of Protostrongylus stilesi, and states that the sheep did not gain the infection from domestic sheep. Discusses research done on rabbits with regard to this disease.
Subject: DP2 Area: B Source: ANNB

SH0423

Pillmore, R.E. and C.A. Moser. 1970.
Bighorn sheep and mountain goat investigations.
F.A. Colorado Project No. W-41-R.

Topics such as artificial salting, census and distribution studies, comparitive range and stomach analysis, lambing study and predator loss of lambs, trapping and transplanting, mortality factors, management and improvement, and census techniques were covered.
Subject: BE2 RT7 DP2 Area: B Source: ANNB

SH0220

Post, G. 1962.
Pasteurellosis of Rocky Mountain bighorn sheep (Ovis canadensis canadensis).
Wildl. Disease 62:63.

Discusses the effectiveness of a multivalent vaccine produced from 7 Pasteurella spp. isolated from bighorn sheep. The study area was the Sybille Wildlife Experimental Unit in Wyoming.
Subject: DP2 Area: B Source: ANNB

SH0363

Potts, M. 1936.
Sixth annual wildlife report, Rocky Mountain National Park.
On file, Library of Rocky Mountain National Park. Colorado.

Describes the incidence of pneumonia and other diseases of Rocky Mountain bighorn sheep in Rocky Mountain National Park. Gives special reference to diseases inflicting lambs.
Subject: DP1 DP2 MF1 Area: B Source: ANNB

SH0410

Potts, M.K. 1941.
A second report upon the status of bighorn in Rocky Mountain Park.
On file, Office of Chief Park Ranger. Rocky Mountain National Park, Colorado.

This was a continued report of the status of bighorn sheep in Rocky Mountain National Park. A study was completed to determine the number, distribution, and ranges of the bighorn. Two pneumonia bacteria, Pasteurella oviseptica and Corynebacterium pyogenes, were mentioned....The paper also dealt with the habitat and ranges of the animals.
Subject: DP2 BE3 NP2 Area: B Source: ANNB

SH0221

Potts, M.K. 1937.
Hemorrhagic Septicemia in the bighorn of Rocky Mountain National Park.
J. Mammal. 18(1):105-106.

Documents the incidence of Hemorrhagic septicemia in bighorn sheep of Rocky Mountain National Park. Physical descriptions of the disease are given. Referred to lamb die-offs due to these organisms in Rocky Mountain National Park as well as in Yellowstone National Park.
Subject: DP2 PD5 Area: B Source: CWSE

SH0222

Potts, M.K. 1938.
Observations on diseases of bighorn in Rocky Mountain National Park.
Trans. Third North Amer. Wildl. Conf., Baltimore, Maryland. Feb. 14-17, 1938:893-897.

Describes the incidence of disease (especially lungworm) in Rocky Mountain bighorn sheep in Colorado. Descriptions are more qualitative than quantitative.
Subject: DP1 DP2 Area: B Source: UOAL

SH0223

Poynter, D. and S. Selway. 1966.
Diseases caused by lungworms.
Helminth Abst. Rev. Article 35(2):113-114.

A bibliography on lungworms. The pages given are those pertaining to Protostronguylus.
Subject: DP2 BW Area: C Source: ANNB

SH0226

Reid, K.W. 1969.
The ecology of certain terrestrial snails and their relationship to the lungworm of bighorn sheep.
MSc. Thesis, Univ. of B.C. Vancouver, British Columbia.

Investigates the ecology of snails which are intermediate hosts of Protostrongylus stilesi, a parasite of Rocky Mountain bighorn sheep. Discusses the effects of climatic and edaphic factors on the snails. Their relationship to the lungworm of bighorn sheep is included. The study area is the East Kootenays of British Columbia.
Subject: DP2 RT5 Area: A Source: UADZ

SH0464

Rosenbusch, C.T. and I. Merchant. 1939.
A study of the Hemorrhagic Septicemia Pasteurella.
J. Bact. 37:69.

Correlates much of the available literature on Pasteurella and its classification. A brief history of the virus was given, and biochemical, cultural, biological and serological studies were outlined.
Subject: DP2 Area: B Source: ANNB

SH0474

Rush, W.M. 1942.
Wild animals of the Rockies.
Harper Brothers. New York.

Gives a general description of bighorn sheep in the Rocky Mountains. Topics include disease, range condition as affecting the health of the animals, some behavior, and the activities of man affecting the herds.
Subject: DP2 RA2 BE1 Area: B Source: ANNB

SH0236

Samuel, W.M., W.K. Hall J.G. Stelfox and W.D. Wishart. 1977.
Parasites of mountain goat, Oreamnos americanus (Blainville), of westcentral Alberta with a comparison of helminths of mountain goat and Rocky Mountain bighorn sheep, Ovis c. canadensis Shaw.
Proc. First International Mountain Goat Symp., Kalispell, Montana. Feb. 19, 1977:212-225.

Compares the prevalence and number of parasites in mountain goat to those in Rocky Mountain bighorn sheep. Sheep were taken from various locations throughout Alberta.
Subject: DP1 DP2 RT5 Area: B Source: UADZ

SH0239

Schmidt, R.L., C.P. Hibler T.R. Spraker and W.H. Rutherford. 1979.
An evaluation of drug treatment for lungworm in bighorn.
J. Wildl. Manage. 43(2):461-467.

Studies treatment of Rocky Mountain bighorn sheep infected with lungworm. The drugs used are Cambenzadole and Fenbenzadole. The study area is Colorado.
Subject: DP2 Area: B Source: CWSE UOAL

SH0241

Schwantje, H. 1984.
A comparitive study of physiologic and pathologic features of Rocky Mountain bighorn sheep herds in the East Kootenays with differing histories of disease occurrence.
B.C. Fish and Wildl. Branch, Progress Report. Cranbrook, British Columbia.

The study outlines the health conditions, status, die-off and recovery of various herds, as well as the diseases and parasites affecting the sheep in the East Kootenays of British Columbia.
Subject: PD2 PD3 DP2 Area: A Source: CWSE

SH0465

Shirlaw, J.F. 1959.
The pneumonia of the sheep with special reference to enzootic pneumonia and Jaagsietke.
Vet. Rev. and Annot. 5(1):37-57.

A complete review of various pneumonic diseases in sheep, with a list of references for both bighorn and domestic sheep. The pathology of the diseases was outlined as well.
Subject: DP2 RT5 Area: B Source: ANNB

SH0268

Spraker, T.R. 1982.
An overview of the clinical signs, gross and histological lesions of the pneumonia complex on bighorn sheep.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:163-172.

Discusses the clinical features, gross and histological lesions in three types of bronchopneumonia in bighorn sheep. The three categories of mortality discussed are : all age die-offs, and two types of summer lamb mortality (verminous and stress-related).
Subject: DP2 RT9 Area: B Source: AFWE

SH0466

Stamp, J., J. Watt and J. Thomlinson. 1955.
Pasteurella Hemolytica Septicemia of lambs.
J. Comp. Path. 65:183-196

The authors gave a short review on pneumonia outbreaks in sheep. Complete post-mortem clinical signs and histological findings were given as well as bacteriological examinations....Pathogenicity tests were run using fresh cultures from lungs, plate cultures and serum broths....Photographs were given of

pathology and organisms in the lung and liver.
Subject: DP2 RT5 RT9 Area: B Source: ANNB

SH0278

Stelfox, J.G. 1967.
Transactions of the first northern wild sheep conference, May 1-9, 1967.
Can. Wildl.Serv. Edmonton, Alberta.

Outlines the proceedings of the wild sheep conference. Topics discussed are population fluctuations, and techniques used in research. The study area is the Rocky Mountains of Alberta and British Columbia. Included are extensive literature reviews - on mountain sheep in general, as well as one on the techniques of field immobilization of animals.
Subject: BW PD2 DP2 RT5 Area: A Source: CWSE

SH0271

Stelfox, J.G. 1966.
An investigation of the current status of bighorn sheep (Ovis canadensis canadensis) in the Radium Hot Springs Area, B.C.
Can. Wildl. Serv. Edmonton, Alberta.

This study documents the status of bighorn sheep in the Radium Hot Springs area, British Columbia. Includes range condition and trend, herd population and distributions as well as diseases and parasites affecting the sheep.
Subject: RA2 BE2 DP2 Area: A Source: CWSE KPNL

SH0294

Stelfox, J.G. 1976.
Diseases and parasites of bighorn sheep in Canadian national parks, 1966 to 1972.
Can. Wildl. Serv. Report to Parks Canada, Western Region. Calgary, Alberta.

Documents the parasites and diseases of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Focuses on the pneumonia-lungworm complex and its role in reducing sheep populations. Particular reference is made to the sheep die-off in Kootenay National Park between 1966 and 1968.
Subject: DP1 DP2 RT5 Area: A Source: KPWL CWSE

SH0467

Stevens, A. 1957.
Respiratory diseases of sheep.
Vet. Rec. 69:1249.

Reviews the respiratory diseases of sheep. Compares Pasteurella multocida, P. hemolytica and P. septica, both biochemically and pathogenically. Discusses further research to be done on vaccines.
Subject: DP1 DP2 RT5 Area: C Source: ANNB

SH0468

Stevenson, R. 1969.
Respiratory diseases of sheep.
Vet. Bull. 39:741-759.

Covers literature on the etiological agents which are associated with sheep pneumonia. Both Rocky Mountain bighorn sheep and domestic sheep were included in the review.
Subject: DP1 DP2 BW Area: B Source: ANNB

SH0309

Streeter, R.G. 1971.
Lungworm infection and mortality in bighorn sheep populations.
Presented at 51'st Amer. Soc. Mammal. Conf. Vancouver, British Columbia.

Examines population die-offs of Rocky Mountain bighorn sheep in two areas in the front range of the Colorado Rockies. Relates lungworm infection to the population declines.
Subject: DP2 PD2 Area: B Source: CWSE

SH0311

Szepanski, W. 1974.
An analysis of North American wild sheep populations.
Unpub. Research Report for St. Cloud College.

Discusses factors influencing population increases and decreases, estimations of these population numbers, and various research management programs of wild sheep in North America.
Subject: RA4 RA6 DP2 MA1 Area: B Source: AFWE

SH0315

Todd, A.W. 1972.
Disease and parasitism in Rocky Mountain bighorn sheep (Ovis c. canadensis) from national parks in Alberta.
Can. Wildl. Serv. Edmonton, Alberta.

Documents occurrence of various diseases and parasites found in the Rocky Mountain bighorn sheep in Jasper, Banff, Kootenay and Waterton Lakes National Parks.
Subject: DP1 DP2 Area: A Source: CWSE

SH0320

Uhazy, L.S. 1969.
Lungworms and other parasites of the Rocky Mountain bighorn sheep.
Unpub. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study which investigates the diseases and parasites of the Rocky Mountain bighorn sheep in the East Kootenay region of British Columbia and southwestern Alberta.
Subject: DP1 DP2 RT5 Area: A Source: CWSE KPNL UADZ

SH0321

Uhazy, L.S. and J.C. Holmes. 1971.
Helminths of the Rocky Mountain bighorn sheep of western Canada.
Can. J. Zool. 49:507-512.

Documents species of helminths, prevalence and intensity, as well as geographical distribution of helminths in the bighorn sheep of Banff, Jasper and Kootenay National Parks.

Subject: DP1 DP2 Area: A Source: CWSE

SH0322

Uhazy, L.S., J.C. Holmes and J.G. Stelfox. 1972.
Lungworms in the Rocky Mountain bighorn sheep of western Canada.
Can. J. Zool. 51(8):817-824.

A detailed analysis of lungworm infection in Rocky Mountain bighorn sheep in western Canada.
Subject: DP2 RT5 Area: A Source: CWSE KPNL KPWL UOAL

SH0328

Wegrzyn, J.G., C.J. Metzger and C.P. Hibler. 1976.
Somatic storage of Protostrongylus spp. third stage larvae in bighorn sheep.
Wyoming Game and Fish Dept. Cheyenne, Wyoming.

Discusses the lung of bighorn sheep as being a site of somatic storage of Protostrongylus spp. third stage larvae. The study area is Colorado.
Subject: DP2 Area: B Source: AFWE

SH0345

Wishart, W.D., J. Jorgenson and M. Hilton. 1980.
A minor die-off of bighorns from pneumonia in southern Alberta (1978).
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:229-247.

Describes the events before and after a minor all age die-off of Rocky Mountain bighorn sheep at the Sheep River Sanctuary, Alberta. Pneumonia is discussed as the cause, and the case histories and results are included.
Subject: PD2 DP2 Area: B Source: AFWE

SH0348

Woodward, T., C. Hibler and B. Rutherford. 1972.
Bighorn lamb mortality investigations in Colorado.
Trans. 1972 North. Wild Sheep and Goat Counc., Hinton, Alberta. April 11-13, 1972:44-48.

Investigates bighorn sheep lamb mortality in Colorado. Causes are mostly related to disease, especially the pneumonia-lungworm complex.
Subject: MF1 DP1 DP2 Area: B Source: AFWE

SH0352

Woolf, A. and D.C. Kradel. 1973.
Mortality in captive bighorn sheep - clinical, hematological, and pathological observations.
J. Wildl. Diseases 9(1):12-17.

Documents the clinical, hematological and pathological findings in captive bighorn sheep in Pennsylvania. Also discusses whether or not blood analysis had prognostic value and could be used to detect the presence of subclinical disease. In addition, possible etiologic agents involved in the lung disease complex were investigated.
Subject: DP1 DP2 RT5 RT9 Area: B Source: UOAL

SH0354

Woolf, A., C.F. Nadler and D.C. Kradel. 1973.
Serum protein electrophoresis in bighorn sheep with chronic pneumonia.
J. Wildl. Diseases 9(1):7-11.

Study investigates the value of serum protein electrophoresis and analysis of the 5 major fractions for detecting and monitoring chronic disease in bighorn sheep. Centers predominantly on lungworm infections .The study area is Pennsylvania.
Subject: DP2 RT8 Area: B Source: UOAL

SH0353

Woolf, A, D.C. Kradel and G.R. Bubash. 1970.
Mycoplasma isolates from pneumonia in captive Rocky Mountain bighorn sheep.
J. Wildl. Diseases 6:169,170.

Documents bacterial isolates from bighorn sheep and discusses the results. No study area was stated.
Subject: DP1 DP2 Area: B Source: CWSE

SH0356

Worley, D.E., S.T. Stewart and T. Komberec. 1976.
Lungworm infection in Montana bighorn sheep a re-examination.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:83-88.

Study updates earlier findings of lungworm infection in Rocky Mountain bighorn sheep in Montana, and reassesses the prevalence of Protostrongylus spp. in many of the same herds examined previously. Also estimates effects of the herd reduction programs and the level of lungworm infection in both the parent herd and the transplanted animals.
Subject: DP2 Area: B Source: AFWE

MANAGEMENT - GENERAL (MA1)

SH0001

Adams, L.G., K.L. Risenhoover and J.A. Bailey. 1982.
Ecological relationships of mountain goats and Rocky Mountain bighorn sheep.
North. Wild Sheep and Goat Counc., Proc. of the Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:9-21.

Discusses the competition between mountain goats and bighorn sheep after mountain goats were introduced into Colorado. Their ecological relationships and adaptations are also discussed. Management considerations are included.
Subject: BE3 NP2 RA4 MA1 Area: B Source: AFWE

SH0005

Amundson, G.A. 1942.
The bighorn sheep.
Arizona Wildl. and Sportsman 1(9).

A resume of present status of mountain sheep (Ovis canadensis spp.) in the western U.S., and suggested management practises.
Subject: PD1 MA1 Area: B Source: UABA

SH0009

Anonymous. 1978.
Bighorn - Kootenay Plains current management plan, draft copy.
Alberta Energy and Natural Resources. Edmonton, Alberta.

Outlines a bighorn sheep management plan for the Kootenay Plains region which addresses the following issues: (1) indiscriminant recreational activity in and around this area, and (2) the unauthorized grazing of livestock (cattle and horses) on public land.
Subject: MA1 Area: B Source: AFWE

SH0007

Anonymous.
Managing Alberta's bighorn sheep.
Alta. Fish and Wildl. Div.
Wildlife Management Series No. 4.

Article gives a general outline of the responsibilities and problems of management when dealing with bighorn sheep in Alberta.
Subject: MA1 Area: A Source: KPNL

SH0015

Bear, G.D. 1979.
Evaluation of bighorn transplants in two Colorado localities.
Colorado Div. of Wildl., Special Report #45.

Evaluates the short term responses of bighorn sheep following transplanting into suitable ranges adjacent to areas presently occupied by bighorn sheep. Also discusses the ecology of each study area and the methods used. The study areas are Cache la Poudre Canyon and Cebolla Creek Wildlife Area in Colorado.
Subject: MA1 RA1 RT6 Area: B Source: AFWE

SH0021

Berryman, J.H. 1972.
The principles of predator control.
J. Wildl. Manage. 36(2):395-400.

Deals with the problems, solutions and methods of predator control, from a management viewpoint. Discusses where, when and how control should be employed, as well as the extent of practise, and the cost in implementing these controls.
Subject: MF3 MA1 Area: C Source: CWSE

SH0030

Bodie, W.L. and W.O. Hickey. 1980.
Response of wintering bighorn sheep to a rest-rotation grazing system in central Idaho.
Proc. Biennial Symp. of the North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:60-69.

Documents changes in the sex and age structure of bighorn sheep populations, using winter ranges grazed season-long by domestic livestock and ranges with a rest-rotation grazing system in the Morgan Creek area of central Idaho.
Subject: RA4 NP2 MA1 Area: B Source: AFWE

SH0489

Branch., B.C. Fish and Wildl. 1979.
Proposed wildlife management plan for British Columbia.
Dept. Conservation, Ministry of Environment. Victoria, B.C.

Outlines a wildlife management plan in British Columbia. Discusses management philosophy, problems and policy, and implementation of the plan. Included is a short report on various species which outlines the specific problems with respect to management.
Subject: MA1 MA2 MA3 MA4 Area: A Source: WNPL

SH0031

Brohn, A. and L.J. Korschgen. 1950.
Precipitin test - a useful tool in game-law enforcement.
Trans. Fifteenth North Amer. Wildl. Conf., San Francisco. March 6,7,9, 1950:467-478.

Discusses the precipitin test as a means of identifying the flesh of game animals in relation to prosecution of game-law violators. Tested mainly on deer and livestock, but can be applied to other big game animals.
Subject: MA1 Area: C Source: UOAL

SH0048

Cooperrider, A.Y. 1969.
Competition for food between mule deer and bighorn sheep on Rock Creek winter range, Montana.
MSc. Thesis, The Univ. of Montana. Missoula, Montana.

A detailed analysis of competition for food between mule deer and bighorn sheep (Ovis canadensis) in western Montana. Some information on management is included in light of the problem of the declining numbers of sheep.
Subject: RA4 MA1 Area: B Source: CWSE

SH0065

Demarchi, D.A. 1978.
Evolution of mountain sheep horn curl regulations in British Columbia.
Proc. of the 1978 North. Wild Sheep and Goat Conf., Penticton, British Columbia. April 2-4,1978:17-30.

Discusses the history of B.C.'s horn curl regulations for bighorn and other mountain sheep. Some management implications are considered in light of the existing regulations.
Subject: MA1 MF4 Area: A Source: AFWE

SH0067

Demarchi, D.A. 1973.
Mountain sheep management for British Columbia.
Prepared by the Bovid Management Committee. Victoria, British Columbia.

Lists distributions of four races of mountain sheep in British Columbia, their historical and present use, and population problems. In light of this, a management policy is established which protects the sheep and their habitat, educates the public, and determines public need and user demand.
Subject: MA1 PD1 PD5 Area: A Source: AFWE

SH0061

Demarchi, D.A. 1967.
An ecological study of Rocky Mountain bighorn sheep winter ranges on the East Kootenay region of British Columbia.
Fish and Wildl. Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

Detailed study into the ecology of the East Kootenay region, using methods such as range composition, enclosures, productivity rating, animal distribution, soil and climatological stations. Documents various ecological factors of the following ranges: Bull River, Wigwam Flats, Premier Ridge, Columbia Lake and Stoddart Creek bighorn winter ranges. Management proposals for each region are included.
Subject: RA3 RA6 MA1 RT4 Area: A Source: BFWV CWSE

SH0068

Demarchi, R.A., D.M. Hebert D.S. Eastman and W.G. MacGregor. 1978.
Preliminary mountain sheep plan for British Columbia.
Ministry of Recreation and Conservation, Fish and Wildlife Branch. Victoria, British Columbia.

Outlines a management plan for all mountain sheep in British Columbia. Rocky Mountain bighorn sheep in Kootenay National Park are included.

Subject: MA1 MA2 Area: A Source: KPNL

SH0079

Erickson, G.L. and J.J. McCarthy. 1976.
The Sun River bighorn sheep management plan.
Proc. Biennial Symp. of the North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:40-55.

Discusses management directions to be initiated to reduce the size of a sheep herd. Techniques mainly involved increased hunting according to the distributions of the sheep.
Subject: MA1 MF4 Area: B Source: AFWE

SH0099

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in Region 3 (Dec. to Jan., 1979-80).
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents results of an aerial sheep survey of fourteen known wintering areas of bighorn sheep in the Red Deer region, Alberta. Survey counts and classifies all observed sheep and then estimates population and harvestable rams based on herd size, composition and distribution of the classified sheep. This information can be used to develop management techniques in the area.
Subject: BE1 BE2 PD1 MA1 Area: B Source: AFWE

SH0100

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in the Rocky Mountain House area of the Eastern Slopes region.
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

The main objectives of this survey were to obtain a count and classification of all observable sheep within each delineated winter range complex. This data was then used to : (1) supplement trend data (density, distribution and composition), (2) predict harvestable rams, (3) allot non-trophy sheep permits, and (4) manage the species.
Subject: PD1 BE1 BE2 MA1 Area: B Source: AFWE

SH0110

Geist, V. 1970.
Sheep management dilemmas.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970: 46-49.

A study of various problems of bighorn sheep management. Hunting is given special consideration.
Subject: MA1 MF4 Area: B Source: CWSE

SH0112

Geist, V. 1972.
On the management of large mammals in national parks - part I.
National and Provincial Parks Assoc. of Can. Toronto, Ontario.
Park News. July 1972:8-14.

Discusses planning for, and management of large mammals in National parks. Various research methods are studied as well.
Subject: MA1 RT4 RT6 Area: C Source: CWSE

SH0104

Geist, V. 1967.
A consequence of togetherness.
Natur. Hist. 76(8):24-31.

Discusses the inability of the North American mountain sheep to disperse into new habitat. Suggests that this problem of reintroduction stems from the inheritance of social traditions of the sheep.
Subject: BE1 MA1 Area: A Source: KPWL

SH0113

Geist, V. 1974.
On the management of mountain sheep : theoretical considerations.
Paper presented at : North. Wild Sheep Counc., Great Falls, Montana. April, 1974.

Discusses the management of mountain sheep (Ovis canadensis and Ovis dalli) in relation to their biology.
Subject: MA1 MA2 RA4 BE3 Area: B Source: CWSE

SH0118

Grunigen, R.E. 1980.
A system for evaluating potential bighorn sheep transplant sites in northern New Mexico.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:211-228.

Evaluates six ranges in New Mexico by assessing important habitat parameters, to determine suitability for bighorn sheep transplants. Discusses applications and limitations of this habitat evaluation system in range suitability, and in developing management strategies for the sheep.
Subject: RT4 MA1 BE3 Area: C Source: AFWE

SH0403

Hall, J.M. 1966.
Bighorn sheep management on the national forests.
Trans. Desert Bighorn Counc. 10:47-52.

Gives historical records of bighorn sheep population estimates in the national forests. Discusses reasons for the declining populations.
Subject: PD5 MA1 Area: B Source: UOAL ANNB

SH0128

Hebert, D.M. 1976.
Intensive sheep production product, Okanagan Game Farm (preliminary outline).
B.C. Fish and Wildl. Branch. Nanaimo, British Columbia.

Contains various papers dealing with bighorn sheep production on the Okanagan Game Farm, British Columbia. Outlines the research program to be conducted on the farm, and includes various techniques and theoretical considerations.
Subject: PD3 MA1 BE1 RT4 Area: B Source: CWSE

SH0142

Hornocker, M.G. 1972.
Predator ecology and management - what now?
J Wildl. Manage. 36(2):401-404.

Discusses how to go about a successful program of predator control. Topics include public education, alternatives to reduction control, and research.
Subject: MF3 MA1 Area: C Source: CWSE

SH0162

Jorgenson, J.T. and W. Wishart. 1981.
Ram Mountain bighorn sheep study.
Progress Report 1981, Fish and Wildl. Div. Edmonton, Alberta.

Determines limiting factors tending to stabilize the Rocky Mountain bighorn sheep population at Ram Mountain, Alberta. Discusses population size, sex ratios, overwinter and lamb survival, productivity, and the effects of non-trophy hunting practises, in terms of possible management procedures.
Subject: PD1 PD3 PD4 MA1 Area: B Source: AFWE

SH0169

Lacey, E.N. 1976.
The management, care and propogation of captive North American mountain sheep.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Jackson, Wyoming. Feb. 10-12, 1976:125-130.

The controlled management, nutrition, capture and transport of Dall, Stone, Rocky Mountain bighorn and California bighorn sheep are discussed. Observations on breeding, disease and behavior of the mountain sheep in captivity are cited. Studies were conducted at the Okanagan Game Farm, British Columbia.
Subject: RT7 MA1 NP1 Area: C Source: AFWE

SH0176

Lawson, B. and R. Johnson. 1983.
Mountain sheep (Ovis canadensis and Ovis dalli). In Chapman, J.A. and G.A. Feldhamer, eds. Wild mammals of North America - biology, management and economics.
The John Hopkins Univ. Press. Baltimore, Maryland.

Discusses general disribution, physical description, physiology, reproduction, ecology of range, food habits, behavior, mortality factors (including diseases and parasites), a list of gastrointestinal nematodes of wild sheep, age determination, population dynamics and management considerations for thinhorn and bighorn sheep in North America.

Subject: DP1 MA1 NP2 RA1 Area: B Source: AFWE

SH0178

Light, J.T., R. Zrelak and H. Graham. 1966.
San Gorgonio bighorn management plan.
U.S. Forest Service.

This plan describes a herd of 75 bighorn in the San Gorgonio Mountain area, and their habitat. It outlines problems occurring in this area, and sets up a management plan to deal with these problems.
Subject: MA1 MA2 MA3 BE3 Area: C Source: CWSE

SH0195

McCabe, R.A. and E.L. Kozicky. 1972.
A position on predator management.
J. Wildl. Manage. 36(2):382-394.

Discusses the different considerations taken into account when determining management objectives with respect to predation. Includes recommendations for management. It also looks at the Leopold Report (Leopold, 1964).
Subject: MF3 MA1 Area: C Source: CWSE

SH0193

Moser, C.A. 1962.
The bighorn sheep of Colorado.
Technical Publication #10, Colorado Game and Fish Dept.

The paper is a good overview of the life of Colorado mountain sheep. Three main groups are studied : Dall, Stone and Rocky Mountain bighorn sheep. It gives clinical diagnoses for sheep which were found dead, and studies causes of die-offs in 1885, 1900 and 1923-24. Some methods of research are described.
Subject: DP1 MF1 MA1 PD2 Area: B Source: CWSE

SH0194

Mussell, D.J. 1982.
Utilization of the Kootenay Plains of western Alberta by ungulates.
Dept. Energy and Natural Resources, Alta. Prov. Govt. Edmonton, Alberta.

Describes ungulate use of the Kootenay Plains of western Alberta. Methods are first described in detail, and then present and past habitat use is stated. Included is the ecology of the study area. In light of the discussion, some proposed regional developments are given.
Subject: RA1 BE2 BE3 MA1 Area: B Source: AFWE

SH0214

Pengelly, L. 1970.
The biology and conservation of North American wild sheep.
Msc. Thesis, Univ. of Montana. Missoula, Montana.

Outlines management considerations in light of diseases, mortality factors, population dynamics and behavior, and range quality of six types of wild sheep in North America. The main study area is the United States.
Subject: MA1 DP1 MF1 PD1 Area: B Source: CWSE

SH0216

Pettus, D. 1982.
Potential genetic effects of small population size in wildlife.
North. Wild Sheep and Goat Counc., Proc. Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:25-33.

Discusses the importance of the genetic quality of a wildlife population when considering management techniques. Genetic diversity, population size and inbreeding are discussed in detail. The concluding section analyzes effects of inbreeding and the number of individuals which must be moved to establish a new population.
Subject: MA1 MA3 Area: B Source: AFWE

SH0380

Pillmore, R.E. 1957.
Lungworm and its relationship to bighorn sheep management.
Proc. Annual Conf. of Western Assoc. of State Game and Fish Comm. 37 :198-205.

Discusses the lifecycle of the lungworm, and how factors such as population density of sheep and snails, livestock use, trapping and transplanting and feeding minerals have an effect on the transmission of lungworm.
Subject: DP2 MA1 Area: B Source: ANNB

SH0233

Rutherford, W.H. 1970.
Bighorn sheep - what is optimum harvest?
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970: 50-54.

An essay covering the problems of management and hunting for general bighorn sheep populations.
Subject: MA1 MF4 Area: A Source: CWSE

SH0496

Schmidt, J.L. and eds. D.L. Gilbert 1980.
Big game of North America, ecology and management.
Stackpole Books. Harrisburg, Pennsylvania.

A good reference on the ecology and management of the big game of North America. Includes short articles on various animals, and concludes with a series of reports dealing specifically with habitat, and management problems.
Subject: BE1 PD1 RA1 MA1 Area: B Source: AFWL

SH0244

Senger, C.M. and D.J. Forrester. 1960.
Experimental infestation of a Rocky Mountain bighorn lamb with Melophagus ovinus (Diptera:Hippoboscidae).
J. Parasit. 46(5):598.

The essay outlines the infection of a bighorn lamb with Melophagus ovinus a parasite of domestic sheep. Because the experiment was successful, management considerations suggested limited contact with domestic sheep.
Subject: DP1 MA1 RT5 Area: C Source: CWSE

SH0265

Smith, K.G. and W.D. Wishart. 1978.
Further observations of bighorn sheep non-trophy seasons in Alberta and their management implications.
B.C. Fish and Wildl. Branch. Okanagan Game Farm, British Columbia.

Examines the questions : (1) What effect does orphaning have on the survival and growth of the lambs , and (2) how does this influence the population dynamics of a bighorn herd. The specific herd studied is from Ram Mountain , Alberta.
Subject: MA1 MF4 Area: B Source: AFWE

SH0286

Stelfox, J.G. 1971.
Self regulation in large mammal populations : it's effectiveness in limiting numbers before the food supply is destroyed or damaged.
Can. Wildl. Serv. Edmonton, Alberta.

Investigates the possibility of self regulation being effective on large mammal populations. The paper relates self regulation to the effects of man's activities with respect to management plans.
Subject: MA1 MA2 MA4 Area: C Source: CWSE

SH0272

Stelfox, J.G. 1966.
Bighorn and Rocky Mountain goat populations, reproductions, harvests and proposed 1966 seasons.
Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents population, reproduction and harvests of bighorn sheep and Rocky Mountain goats in the Coalbranch region, Alberta. Range condition, trend, and climates are discussed for this area. Some management considerations with respect to harvesting are also outlined.
Subject: PD4 RA2 MA1 MF4 Area: B Source: CWSE

SH0269

Stelfox, J.G. 1964.
Bighorn ecological study in the Coalbranch Region (Drummond Creek south to Ruby Creek).
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents range conditions, distribution and population of bighorn sheep and elk herds in the Drummond-Ruby Creek region of the Coalbranch, in order that some effective management proposals could be outlined.
Subject: PD1 BE1 BE2 MA1 Area: B Source: CWSE

SH0292

Stelfox, J.G. 1974.
Wildlife management concepts in Canadian national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Discusses the negative and positive points of the Zootic Disclimax (stabilized biotic disclimax) theory. Includes an analysis of the effects of man's activities on the wildlife ranges.

Subject: MA1 MA2 MA4 Area: C Source: CWSE

SH0281

Stelfox, J.G. 1969.
Status of bighorn sheep at Vermilion Lakes, Banff National Park, May 1969.
Can. Wildl. Serv. Edmonton, Alberta.

This paper outlines the range conditions and general population status of the Vermilion Lakes herd of bighorn sheep. Some management suggestions for this particular herd are included.
Subject: RA1 MA1 BE2 Area: B Source: CWSE KPWL

SH0291

Stelfox, J.G. 1974.
Wildlife and wildlife habitat : census inventory.
Can. Wildl. Serv. Edmonton, Alberta.

Outlines objectives and methods of surveying wildlife in North America. Discusses types of ground and aerial census techniques. Some management suggestions with respect to conservation and preservation are gives.
Subject: MA1 RT4 RT6 Area: C Source: CWSE

SH0300

Stelfox, J.G. and J.R. Robertson. 1973.
Immobilizing bighorns with Anectine and Sernylan.
Can. Wildl. Serv. Edmonton, Alberta.

Report outlined and documented the use of Anectine and Sernylan to capture free-ranging bighorn sheep for weighing, tagging and transplanting purposes. The two drugs were compared as to adverse effects on the animals. The study was conducted in various national parks of the Canadian Rocky Mountains.
Subject: RT7 MA1 Area: A Source: CWSE KPNL

SH0304

Stevens, D.R. 1982.
Bighorn sheep management in Rocky Mountain National Park.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:244-253.

Discusses management objectives which would reduce stress on bighorn sheep in Rocky Mountain National Park. The methods described are : control of range use by visitors to the park and transplanting the animals. Some range ecology for the area, as well as the history of the herds is included.
Subject: MA1 MA3 MA4 Area: B Source: AFWE

SH0311

Szepanski, W. 1974.
An analysis of North American wild sheep populations.
Unpub. Research Report for St. Cloud College.

Discusses factors influencing population increases and decreases, estimations of these population numbers, and various research management programs of wild sheep in North America.
Subject: RA4 RA6 DP2 MA1 Area: B Source: AFWE

SH0313

Taylor, W.P. 1947.
Some new techniques - hoofed mammals.
Trans. 12'th North Amer. Wildl. Conf., San Antonio, Texas. Feb. 3-5, 1947:293-322.

Briefly discusses various methods of management of hoofed mammals. Three pertain to bighorn sheep specifically : trapping and transplanting sheep in Colorado, dropping analysis for lungworm in bighorns and mineralized salt blocks for the sheep.
Subject: MA1 MA3 RT5 RT7. Area: C Source: UOAL

SH0314

Thorne, E.T., T. Varcalli K. Becker and G.B. Butler. 1978.
Some thoughts on the consequences of non-trophy sheep hunting in the Wind River Mountains of Wyoming.
Proc. 1978 North. Wild Sheep and Goat Conf., Penticton, B.C. 1978:41-52.

Discusses various consequences, advantages and disadvantages of non-trophy sheep hunting in the Wind River Mountains of Wyoming. Sheep considered are Rocky Mountain bighorn sheep.
Subject: MA1 MF4 Area: B Source: AFWE

SH0325

Tighem, K. Van 1981.
Mortality of bighorn sheep (Ovis canadensis) on a railroad and highway in Jasper National Park, Canada.
Can. Wildl. Serv. Edmonton, Alberta.

Documents sheep mortality primarily on the C.N.R. and Yellowhead Highway in Jasper National Park. Some solutions in the way of management are given.
Subject: MF2 PD2 MA1 Area: B Source: CWSE

SH0503

Trefethen, J.B. (Editor). 1975.
The wild sheep in modern North America.
Proc. workshop on the Management Biology of North American wild sheep. U of Montana, Missoula, July 18-20, 1974. Boone & Crockett Club. The Winchester Press, N.Y.

Purpose was to compile information on the status, distribution and trends of North American wild sheep populations, assess the impact of past and current management programs, determine the state of knowledge of the management biology of these populations and to develop management guidelines to assure the future well-being of wild sheep.
Subject: MA1 MA3 BW Area: B Source: CWSE

SH0342

Wishart, W.D. 1979.
Species management plan for the Rocky Mountain bighorn sheep in Alberta.
Alta. Fish and Wildl. Edmonton, Alberta.

Paper is in four sections as follows : (1) perspective of the North American status and management of bighorns, (2) history of bighorn sheep management in Alberta, (3) distribution and status of bighorn sheep, and (4) recommendations for future management.

Subject: MA1 MA2 MA3 PD5 Area: B Source: AFWE

SH0339

Wishart, W.D. 1975.
Non-trophy sheep harvest summary 1966-74.
Alta. Fish and Wildl. Edmonton, Alberta.

For each region, the hunting success, based on the annual kill and total number of permits given, is outlined. The ages of the non-trophy sheep as outlined by the hunters on questionnaires are given as well. The study area is various locations in Alberta.
Subject: MA1 MF4 Area: B Source: AFWE

SH0334

Wishart, W.D. 1958.
The bighorn sheep of the Sheep River Valley.
Unpub. MSc. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study conducted in the Sheep River Valley, Alberta. Topics included are food habits, various mortality factors, some seasonal movements, and management techniques.
Subject: MF1 BE2 NP2 MA1 Area: B Source: CWSE UOAL

SH0338

Wishart, W.D. 1970.
When and why it is good management to shoot bighorn ewes and lambs.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970: 56-60.

A paper covering general management of bighorn sheep in various areas. Deals specifically with man's harvesting of ewes and lambs.
Subject: MA1 MF4 Area: A Source: CWSE

SH0340

Wishart, W.D. 1975.
Report and recommendations of the Rocky Mountain bighorn workshop group. In The wild sheep in modern North America. J.B. Trefethen, ed.
Editorial Committee of the Boone and Crockett Club. New York, U.S.A.

Outlines suggestions for various management techniques, especially habitat improvement and manipulation. Different areas and states inhabited by these animals are discussed separately. Focuses particularly on the Rocky Mountain bighorn sheep.
Subject: MA1 MA2 Area: A Source: CWSE

SH0341

Wishart, W.D. 1976.
The Ram Mountain orphan lamb experiment.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:70-80.

Preliminary report of the orphan lamb experiment on Ram Mountain in Alberta. Studies the survival of selectively orphaned lambs as compared to non-orphans. The growth patterns are documented, and implications of orphaning with respect to hunting regulations and management considerations is

included.
Subject: MA1 PD3 PD4 Area: B Source: AFWE

SH0347

Wood, J.E. 1960.
A bibliography of bighorn sheep.
Trans. Desert Bighorn Counc. 4:101-111.

The 180 references were divided into ecology and management, inventories and hunting records, general references to taxonomy, geographic areas, distribution, predation, parasites and diseases, reproduction and miscellaneous notes, techniques and popular articles of a general nature.
Subject: BW MA1 BE2 DP1 Area: C Source: ANNB

RANGE MANAGEMENT (MA2)

SH0477

Bailey, A.W. 1977.
Prescribed burning as an important tool for Canadian rangelands. In range improvement in Alberta : a literature review.
Univ. of Alberta. Edmonton, Alberta.
Subject: BW MA2 Area: A Source: CWSE

SH0414

Bandy, P.J. 1970.
The paradox of the bighorn sheep.
Trans. North. Wild Sheep Counc. pp. 1-4.

Discusses the deteriorating range conditions of bighorn sheep as being responsible for outbreaks of disease, and various other types of stress. Outlines management objectives to deal with this problem.
Subject: RA2 MA2 Area: B Source: ANNB AFWE

SH0019

Bentz, J.A. 1981.
Effects of fire on the subalpine range of Rocky Mountain bighorn sheep in Alberta.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Study objectives were: (1) to determine differences in the quantity and quality of available forage between burned and adjacent unburned forest sites, (2) to assess the factors which may limit or contribute to the use of fire-disturbed sites by bighorn sheep, and (3) to assess the effects of burning on the establishment and growth of important range plants commonly used by bighorn sheep. The study areas were: Ghost River, Rock Creek, Ram Mountain and Cadomin Mountain, Alberta.
Subject: RA3 MA2 Area: B Source: AFWE

SH0489

Branch., B.C. Fish and Wildl. 1979.
Proposed wildlife management plan for British Columbia.
Dept. Conservation, Ministry of Environment. Victoria, B.C.

Outlines a wildlife management plan in British Columbia. Discusses management philosophy, problems and policy, and implementation of the plan. Included is a short report on various species which outlines the specific problems with respect to management.
Subject: MA1 MA2 MA3 MA4 Area: A Source: WNPL

SH0066

Demarchi, R. and P. Davidson. 1982.
East Kootenay bighorn sheep habitat enhancement.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A report dealing with management techniques designed to preserve and increase the population of Rocky Mountain bighorn sheep. Included is specific data on range conditions, the pneumonia-lungworm disease and various research techniques.
Subject: MA2 RA2 RA3 DP2 Area: A Source: CWSE

SH0068

Demarchi, R.A., D.M. Hebert D.S. Eastman and W.G. MacGregor. 1978.
Preliminary mountain sheep plan for British Columbia.
Ministry of Recreation and Conservation, Fish and Wildlife Branch. Victoria, British Columbia.

Outlines a management plan for all mountain sheep in British Columbia. Rocky Mountain bighorn sheep in Kootenay National Park are included.
Subject: MA1 MA2 Area: A Source: KPNL

SH0501

Eastman, D.S. 1972.
Current knowledge of ungulate competition in southern British Columbia. In Interactions between cattle and wild ungulates in southern B.C., J.E. Miltmore, ed.
Proc. Informal Work Planning Meeting, Kamloops, B.C. Sept. 28-29, 1972: 40-51.

Discusses wild-domestic ungulate competition in various regions of southern B.C. Gives a list of measurements which must be obtained in order to determine the level of competition. Management suggestions are made for decreasing the level of competition.
Subject: RA4 NP2 MA2 Area: B Source: LARS

SH0113

Geist, V. 1974.
On the management of mountain sheep : theoretical considerations.
Paper presented at : North. Wild Sheep Counc., Great Falls, Montana. April, 1974.

Discusses the management of mountain sheep (Ovis canadensis and Ovis dalli) in relation to their biology.
Subject: MA1 MA2 RA4 BE3 Area: B Source: CWSE

SH0394

Halloran, A.F. and O.V. Deming. 1958.
Water development for bighorn sheep.
J. Wildl. Manage. 22(1):1-9.

Describes the devices used and results obtained when experimenting with various means of development of water on sheep range. Some management considerations are given for improving sheep range.
Subject: MA2 Area: B Source: ANNB UOAL

SH0156

Jensen, C.H., A.D. Smith and G.W. Scotter. 1972.
Guidelines for grazing sheep on rangelands used by big game in winter.
J. Range Manage. 25(5):346-352.

Discusses forage competition between big game and domestic sheep in northern Utah on a big game winter range. Outlines possible management techniques to minimize this competition.
Subject: RA3 RA4 RA6 MA2 Area: B Source: CWSE

SH0178

Light, J.T., R. Zrelak and H. Graham. 1966.
San Gorgonio bighorn management plan.
U.S. Forest Service.

This plan describes a herd of 75 bighorn in the San Gorgonio Mountain area, and their habitat. It outlines problems occurring in this area, and sets up a management plan to deal with these problems.
Subject: MA1 MA2 MA3 BE3 Area: C Source: CWSE

SH0484

Lyon, J.L., H.S. Crawford E. Czuhai R.L. Fredriksen R.F. Harlow L.J. Metz and H.A. Pearson. 1978.
Effects of fire on fauna, a state-of-knowledge review.
USDA For. Serv. Gen. Tech. Rep. WO-6.
National Fire Effects Workshop, Denver, Colorado. April 10-14, 1978.
Subject: MA2 Area: C Source: CWSE

SH0485

MacLean, D.A., S.J. Woodley M.G. Weber and R.W. Wein. 1979.
Fire and nutrient cycling.
Presented at Symp. : Fire in Northern Circumpolar Ecosystems, Fredricton, New Brunswick. October 22-24, 1979.
Subject: MA2 Area: C Source: CWSE

SHO506

Peck, J.M., D.A. Demarchi R.A. Demarchi and D.E. Stucker. 1984.
Bighorn sheep and fire: seven case histories.
Paper presented at Symposium on Fire Effects on Wildlife Habitat, Missoula, Montana, March 21, 1984.

Responses of seven bighorn sheep populations and habitats to prescribed fire and wildlife in southern B.C., Idaho and Glacier National Park, Montana are reported. Lists factors to be considered before prescribed fire is used in bighorn habitats.

Subject: RA2 RA3 MA2 Area: A Source: BFWV CWSE

SH0487

Peek, J.M., R.A. Riggs and J.L. Lauer. 1979.
Evaluation of fall burning on bighorn sheep winter range.
J. Range Manage. 32(6):430-432.
Subject: MA2 Area: B Source: UOAL

SH0260

Smith, D.R. 1954.
The bighorn sheep in Idaho, its status, life history and management.
Dept. of Fish and Game, State of Idaho. Boise, Idaho.

A general study on bighorn sheep in Idaho with an analysis of why the population numbers are declining, and what can be done to alter the situation. Habitat, behavior diseases and management are discussed.
Subject: PD1 MA2 MA3 Area: B Source: CWSE

SH0292

Stelfox, J.G. 1974.
Wildlife management concepts in Canadian national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Discusses the negative and positive points of the Zootic Disclimax (stabilized biotic disclimax) theory. Includes an analysis of the effects of man's activities on the wildlife ranges.
Subject: MA1 MA2 MA4 Area: C Source: CWSE

SH0286

Stelfox, J.G. 1971.
Self regulation in large mammal populations : it's effectiveness in limiting numbers before the food supply is destroyed or damaged.
Can. Wildl. Serv. Edmonton, Alberta.

Investigates the possibility of self regulation being effective on large mammal populations. The paper relates self regulation to the effects of man's activities with respect to management plans.
Subject: MA1 MA2 MA4 Area: C Source: CWSE

SH0270

Stelfox, J.G. 1964.
Bighorn management problems in the Coalbranch Region.
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Summarizes range conditions, trend, utilization, and vegetation of bighorn sheep in the Coalbranch region, Alberta. In light of population dynamics and behavior, some management techniques are discussed for these herds.
Subject: RA2 RA3 MA2 MA3 Area: B Source: CWSE

SH0293

Stelfox, J.G. 1976.
Determination of ungulate carrying capacities in national parks.
Can. Wildl. Serv. Edmonton, Alberta.
Palisades Training School, March 1 and 2, 1976. Ungulate Management.

Discusses the methods by which one can determine the range carrying capacity of ungulates in national parks. The carrying capacity is considered from a grazing capacity standpoint with respect to possible management objectives.
Subject: RA3 RT4 MA2 Area: C Source: CWSE

SH0302

Stelfox, J.G. and D.J. Spalding. 1974.
Bighorn sheep ecology study, Vaseux - Bighorn Wildlife Area.
Can. Wildl. Serv. Edmonton, Alberta.

Documented population dynamics and range conditions in order to recommend range rejuvenation. The herds were made up of California bighorn sheep in the south Okanagan Valley.
Subject: RA2 RA4 RA6 MA2 Area: B Source: CWSE

SH0303

Stelfox, J.G. and R.D. Taber. 1969.
Big game in the northern Rocky Mountain coniferous forest.
Coniferous Forests of the Rocky Mountains : Proc. 1968 Symp.:197-222.

Discusses range vegetation, seasonal distributions and management techniques for big game (wapiti, deer, moose, caribou, bison, mountain goats and bighorn sheep) in the coniferous forest of the northern Rocky Mountains.
Subject: RA1 BE2 MA2 Area: B Source: CWSE

SH0326

Vogel, W.G. and G.M. Van Dyke. 1966.
Vegetation responses to grazing management on a foothill sheep range.
J. Range Manage. 19(2):80-85.

Report outlines how a central Montana foothill range was subject to grazing management, and the vegetation's response to the treatment.
Subject: MA2 RA2 Area: B Source: CWSE

SH0340

Wishart, W.D. 1975.
Report and recommendations of the Rocky Mountain bighorn workshop group. In The wild sheep in modern North America. J.B. Trefethen, ed.
Editorial Committee of the Boone and Crockett Club. New York, U.S.A.

Outlines suggestions for various management techniques, especially habitat improvement and manipulation. Different areas and states inhabited by these animals are discussed separately. Focuses particularly on the Rocky Mountain bighorn sheep.
Subject: MA1 MA2 Area: A Source: CWSE

SH0342

Wishart, W.D. 1979.
Species management plan for the Rocky Mountain bighorn sheep in Alberta.
Alta. Fish and Wildl. Edmonton, Alberta.

Paper is in four sections as follows : (1) perspective of the North American status and management of bighorns, (2) history of bighorn sheep management in Alberta, (3) distribution and status of bighorn sheep, and (4) recommendations for future management.
Subject: MA1 MA2 MA3 PD5 Area: B Source: AFWE

POPULATION MANAGEMENT (MA3)

SH0489

Branch., B.C. Fish and Wildl. 1979.
Proposed wildlife management plan for British Columbia.
Dept. Conservation, Ministry of Environment. Victoria, B.C.

Outlines a wildlife management plan in British Columbia. Discusses management philosophy, problems and policy, and implementation of the plan. Included is a short report on various species which outlines the specific problems with respect to management.
Subject: MA1 MA2 MA3 MA4 Area: A Source: WNPL

SH0045

Cook, A.R. 1978.
Aerial sheep survey of the Edson, Red Deer and Calgary regions using the revised winter range technique.
Alta. Recreation, Parks and Wildl., Fish and Wildl. Div. Edmonton, Alberta.

Outlines the results obtained using a revised winter range technique for an aerial bighorn sheep survey of the Edson, Red Deer and Calgary regions. The method was designed to reduce survey hours while maintaining an adequate information level for management. Survey objective was to obtain an accurate count and classifiation of observable sheep within each delineated winter complex. Collected information on herd size, composition, and distribution which provided a basis for population estimates, prediction of harvestable rams, trends, and species management.
Subject: MA3 RT6 Area: B Source: AFWE

SH0448

Couey, F.M. 1955.
Montana bighorn sheep.
Proc. 35th Annual Conf. of Western Assoc. of State Game and Fish Comm. 35:162-166.

Gave the present status, trapping and transplanting operations, mortality factors, and range conditions of bighorn sheep in Montana.
Subject: PD1 MA3 MF1 RA1 Area: B Source: ANNB

SH0470

Couey, F.M. et al. 1952.
Wildlife surveys and management.
F.A. Montana Project No. W-1-R. Helena, Montana.

Discusses the history, present distribution, populations, range use, moratality factors and management of the Sun River bighorn sheep herd in Montana.
Subject: PD1 BE2 MA3 MF1 Area: B Source: ANNB

SH0449

Demarchi, R. 1970.
Artificiality in mountain sheep management.
Trans. North. Wild Sheep Counc. pp. 54-55.

Discusses whether or not a mountain sheep population would disappear in the absence of man. The three attitudes of artificialities looked into are the veterinary and agricultural approaches and trapping by biologists.
Subject: MA3 Area: B Source: AFWE ANNB

SH0450

Deming, O.V. 1955.
Rearing bighorn lambs in captivity.
California Fish and Game 41(2):131-143.

Looks at the care of bighorn lambs being reared in captivity, as well as pregnant ewes. Possible diseases and remedies were also discussed.
Subject: MA3 RT7 Area: B Source: ANNB

SH0457

Durbin, C.G. 1951.
Lungworm infection in sheep.
Proc. Amer. Vet. Med. Assoc. 88:116-118.

Larvae and adults of three genera of lungworms were differentially described (Dictyocaulus, Muellerius and Protostrongylus). Control measures were discussed.
Subject: DP2 MA3 Area: C Source: ANNB

SH0458

Hall, M.C. 1931.
Parasite control in wild animals..
Outdoor America July:16-17, 46.

Covers various specific problems of parasites in wild animals, including the lungworms of bighorn sheep. Some reasons were outlined as contributing to the susceptibility of the sheep to this disease.
Subject: DP2 MA3 RT5 Area: B Source: ANNB

SH0133

Hickey, W.O. 1977.
Bighorn sheep ecology.
Idaho Dept. of Fish and Game, Project W160R4. Salmon, Idaho.

The report is broken down into four main areas of study : (1) classification of ranges by vegetation habitat type, and definition of food habits, (2) movements, migrations, population dynamics of selected bighorn populations, (3)

re-introduction as a management technique, and (4) evaluation of bighorn sheep hunting. The studies were conducted at various locations throughout Idaho.
Subject: BE2 NP2 MA3 MF4 Area: B Source: CWSE

SH0138

Honess, R.F. and N.M. Frost. 1942.
A Wyoming bighorn sheep study.
Wyoming Fish and Game Dept. Bulletin #1.

Studied population size and distributions of bighorn sheep in Wyoming. Decimation factors were considered. Some suggested factors were insufficient and deficient winter forage, and contagious ecthyma in lambs and adults. Recommendations for supplemental feeding were made.
Subject: BE2 DP2 MA3 RA2 Area: B Source: ANNB

SH0178

Light, J.T., R. Zrelak and H. Graham. 1966.
San Gorgonio bighorn management plan.
U.S. Forest Service.

This plan describes a herd of 75 bighorn in the San Gorgonio Mountain area, and their habitat. It outlines problems occurring in this area, and sets up a management plan to deal with these problems.
Subject: MA1 MA2 MA3 BE3 Area: C Source: CWSE

SH0420

Monson, G.C. 1961.
The importance of population data.
Trans. Desert Bighorn Counc. 5:108-109.

Discusses why population data is so important when studying sheep. Some topics discussed are movements, declines in numbers and population fluctuations with climate.
Subject: PD1 MA3 Area: B Source: ANNB UOAL

SH0216

Pettus, D. 1982.
Potential genetic effects of small population size in wildlife.
North. Wild Sheep and Goat Counc., Proc. Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:25-33.

Discusses the importance of the genetic quality of a wildlife population when considering management techniques. Genetic diversity, population size and inbreeding are discussed in detail. The concluding section analyzes effects of inbreeding and the number of individuals which must be moved to establish a new population.
Subject: MA1 MA3 Area: B Source: AFWE

SH0217

Pillmore, R.E. 1954.
Report on the bighorn.
Colorado Conservation 3(1):19-21.

Discusses the hunting season with respect to (1) relief of concentrations of bighorn sheep apparently responsible for a lungworm epidemic, and (2) removal

of surplus rams for a more favorable sex ratio. Includes documented incidence of lungworm. The study area is Colorado.
Subject: DP2 MA3 MF4 Area: B Source: UABA

SH0453

Rush, W.M. 1935.
The Rocky Mountain bighorn.
The Colorado Forester, Wildl. Ed. Fort Collins, Colorado. 1935:21-24.

Investigates the low numbers and declining populations of bighorn sheep in Colorado. Management suggestions were made to stop the declination.
Subject: PD2 MA3 MA4 Area: B Source: ANNB

SH0237

Schallenberger, A. 1972.
Management and research on bighorn sheep, Sun River Area, Montana.
Trans. North. Wild Sheep Conf., Hinton, Alberta. April 11-13, 1972:2-14.

Documents and discusses harvest by hunters and transplanting of bighorn sheep in the Sun River Area, Montana. The success of transplanting as a management technique is also discussed.
Subject: MA3 MF4 Area: B Source: CWSE

SH0248

Shackleton, D.M. 1976.
Variability in physical and social maturation between bighorn sheep (Ovis canadensis canadensis Shaw) populations.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:1-8.

Examines potential implications of observed variability in physical and social maturation between bighorn sheep populations in Banff and Kootenay National Parks. Relates this difference to some of the problems which may be faced in the management of mountain sheep.
Subject: MA3 PD4 Area: A Source: AFWE

SH0428

Smith, D.R. 1953.
Idaho bighorn sheep studied.
Idaho Wildl. Rev. 5(5):4-7, 10.

Gives physical attributes, location, early history, losses, herd productivity, and management considerations of bighorn sheep in Idaho.
Subject: PD1 PD5 MA3 Area: B Source: ANNB

SH0427

Smith, D.R. 1955.
Management study of the Rocky Mountain bighorn sheep.
F.A. Idaho Project No. W-99-R.

Investigates the population declines of bighorn sheep in Idaho. Looks at the causes, techniques used for population dynamics, and gives management suggestions for halting the declines.
Subject: MA3 MF3 RT6 Area: B Source: ANNB

SH0260

Smith, D.R. 1954.
The bighorn sheep in Idaho, its status, life history and management.
Dept. of Fish and Game, State of Idaho. Boise, Idaho.

A general study on bighorn sheep in Idaho with an analysis of why the population numbers are declining, and what can be done to alter the situation. Habitat, behavior diseases and management are discussed.
Subject: PD1 MA2 MA3 Area: B Source: CWSE

SH0270

Stelfox, J.G. 1964.
Bighorn management problems in the Coalbranch Region.
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Summarizes range conditions, trend, utilization, and vegetation of bighorn sheep in the Coalbranch region, Alberta. In light of population dynamics and behavior, some management techniques are discussed for these herds.
Subject: RA2 RA3 MA2 MA3 Area: B Source: CWSE

SH0304

Stevens, D.R. 1982.
Bighorn sheep management in Rocky Mountain National Park.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:244-253.

Discusses management objectives which would reduce stress on bighorn sheep in Rocky Mountain National Park. The methods described are : control of range use by visitors to the park and transplanting the animals. Some range ecology for the area, as well as the history of the herds is included.
Subject: MA1 MA3 MA4 Area: B Source: AFWE

SH0313

Taylor, W.P. 1947.
Some new techniques - hoofed mammals.
Trans. 12'th North Amer. Wildl. Conf., San Antonio, Texas. Feb. 3-5, 1947:293-322.

Briefly discusses various methods of management of hoofed mammals. Three pertain to bighorn sheep specifically : trapping and transplanting sheep in Colorado, dropping analysis for lungworm in bighorns and mineralized salt blocks for the sheep.
Subject: MA1 MA3 RT5 RT7 Area: C Source: UOAL

SH0503

Trefethen, J.B. (Editor). 1975.
The wild sheep in modern North America.
Proc. workshop on the Management Biology of North American wild sheep. U of Montana, Missoula, July 18-20, 1974. Boone & Crockett Club. The Winchester Press, N.Y.

Purpose was to compile information on the status, distribution and trends of North American wild sheep populations, assess the impact of past and current management programs, determine the state of knowledge of the management biology of these populations and to develop management guidelines to assure

the future well-being of wild sheep.
Subject: MA1 MA3 BW Area: B Source: CWSE

SH0342

Wishart, W.D. 1979.
Species management plan for the Rocky Mountain bighorn sheep in Alberta.
Alta. Fish and Wildl. Edmonton, Alberta.

Paper is in four sections as follows : (1) perspective of the North American status and management of bighorns, (2) history of bighorn sheep management in Alberta, (3) distribution and status of bighorn sheep, and (4) recommendations for future management.
Subject: MA1 MA2 MA3 PD5 Area: B Source: AFWE

RESOURCE DEVELOPMENT CONFLICTS (MA4)

SH0324

Akker, J.B. Van Den 1960.
Human encroachment on bighorn habitat.
Fourth Annual Meet. Desert Bighorn Counc., Las Cruces, New Mexico. April 5-8, 1960:38-40.

General discussion of human encroachment on bighorn sheep habitat. Covers various types of human activity which adversely affect sheep.
Subject: MA4 Area: C Source: UOAL

SH0489

Branch., B.C. Fish and Wildl. 1979.
Proposed wildlife management plan for British Columbia.
Dept. Conservation, Ministry of Environment. Victoria, B.C.

Outlines a wildlife management plan in British Columbia. Discusses management philosophy, problems and policy, and implementation of the plan. Included is a short report on various species which outlines the specific problems with respect to management.
Subject: MA1 MA2 MA3 MA4 Area: A Source: WNPL

SH0081

Etter, H.M. 1973.
Mined-land reclamation studies on bighorn sheep range in Alberta, Canada.
Biological Conservation 5(3):191-195.

Discusses the impact of man's resource development activities (particularly surface mining) on the winter ranges of bighorn sheep in Alberta.
Subject: MA4 Area: B Source: CWSE

SH0109

Geist, V. 1971.
A behavioral approach to the management of wild ungulates.
11'th Symp. of the Brit. Ecol. Soc., The Univ. of East Anglia, Norwich. July 7-9, 1970.

Describes how wild ungulates (including bighorn sheep in Alberta and B.C.) cope with man's activities and disturbances on their natural habitat. Various physical changes are described as being a result of harrassment. and a change of range utilization is discussed. Wildlife management objectives are outlined, in light of the discussion.
Subject: RA3 BE1 BE2 MA4 Area: C Source: AFWE

ID = SH0140

Horejsi, B. 1976.
Some thoughts and observations of harrassment and bighorn sheep.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:149-155

Discusses man's activities on sheep range and harrassment (active and passive) of mountain sheep in Alberta. Includes a description of animal behavior and reaction to this harrassment, and relates this to management objectives.
Subject: MA4 BE1 Area: B Source: AFWE

SH0418

Jones, F.L. 1960.
The esthetics of bighorn management.
Trans. Desert Bighorn Counc. 4:47-48.

Discusses the effects of hunting on bighorn sheep populations, and suggests management techniques to deal with problems in this area.
Subject: MF4 MA4 Area: B Source: ANNB UOAL

SH0170

Lacy, C. 1971.
A case for the bighorn sheep.
Alta. Fish and Wildl. Hinton, Alberta.

Discusses deteriorating bighorn range conditions on the eastern slopes of the Rocky Mountains, Alberta, as being caused by man's activities - in particular, mining. Discusses various effects mining has on the land, and suggests some management procedures.
Subject: RA2 RA5 MA4 Area: B Source: AFWE

SH0180

MacArthur, R.A., R.H. Johnson and V. Geist. 1979.
Factors influencing heart rate in free-ranging bighorn sheep : a physiological approach to the study of wildlife harrassment.
Can. J. Zool. 57(10):2010-2021.

Documents changes in heart rates of Rocky Mountain bighorn ewes in response to various stimuli (ie - man's activities and predators) as well as changes in the environment. Found that the heart rate can be a good indicator of the health and condition of the animal. The methods used are outlined in detail. The Sheep River Wildlife Sanctuary, Alberta was the study area.

Subject: MA4 PD5 Area: B Source: CWSE

SH0421

Morgan, J.K. 1970.
An analysis of the effects of ten years open season hunting on bighorn sheep population in Idaho.
Trans. North. Wild Sheep Counc. p. 34.

Gives an analysis of the effects of having open season hunting on bighorn sheep populations in Idaho. Some management alternatives are given to reduce negative effects of the hunting.
Subject: MF4 MA4 Area: B Source: ANNB AFWE

SH0452

Nelson, M. 1966.
Problems of recreational use of game ranges.
Trans. Desert Bighorn Counc. 10:13-20.

Discusses man's activities (picnicking, camping, exploring, hiking, hunting, desert dwelling and rockhounds) on game ranges, and investigates their effects on the animals inhabiting these areas.
Subject: MA4 Area: B Source: ANNB UOAL

SH0422

Pillmore, R.E. 1958.
Buffalo Peaks bighorn seasons.
Outdoor Facts #11, Colorado Game, Fish and Parks Game Information Leaflet.

Outlines the Buffalo Peaks bighorn seasons from 1953-1958. A description of diseases and parasites found in the animals id given.
Subject: MF4 MA4 Area: B Source: ANNB

SH0453

Rush, W.M. 1935.
The Rocky Mountain bighorn.
The Colorado Forester, Wildl. Ed. Fort Collins, Colorado. 1935:21-24.

Investigates the low numbers and declining populations of bighorn sheep in Colorado. Management suggestions were made to stop the declination.
Subject: PD2 MA3 MA4 Area: B Source: ANNB

SH0286

Stelfox, J.G. 1971.
Self regulation in large mammal populations : it's effectiveness in limiting numbers before the food supply is destroyed or damaged.
Can. Wildl. Serv. Edmonton, Alberta.

Investigates the possibility of self regulation being effective on large mammal populations. The paper relates self regulation to the effects of man's activities with respect to management plans.
Subject: MA1 MA2 MA4 Area: C Source: CWSE

SH0287

Stelfox, J.G. 1972.
Elements of controversy concerning resource exploitation on the welfare of native North American ungulate populations.
Can. Wildl. Serv. Edmonton, Alberta.

Discusses the effect of man's activities (logging, livestock grazing, roads, railways, mining, dams, resource development and military training) on ungulates in North America (specifically, deer, elk and moose).
Subject: MA4 Area: C Source: CWSE

SH0292

Stelfox, J.G. 1974.
Wildlife management concepts in Canadian national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Discusses the negative and positive points of the Zootic Disclimax (stabilized biotic disclimax) theory. Includes an analysis of the effects of man's activities on the wildlife ranges.
Subject: MA1 MA2 MA4 Area: C Source: CWSE

SH0304

Stevens, D.R. 1982.
Bighorn sheep management in Rocky Mountain National Park.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:244-253.

Discusses management objectives which would reduce stress on bighorn sheep in Rocky Mountain National Park. The methods described are : control of range use by visitors to the park and transplanting the animals. Some range ecology for the area, as well as the history of the herds is included.
Subject: MA1 MA3 MA4 Area: B Source: AFWE

SH0307

Streeter, R.G. 1969.
Demography of two Rocky Mountain bighorn sheep populations in Colorado.
Unpub. PhD. Thesis, Colorado State Univ. Fort Collins, Colorado.

Studies the change in range ecology, population growth and mortality over a four year study period of 2 Rocky Mountain bighorn sheep populations at Buffalo Peaks, Colorado. Discusses hunting and nutritional deficiencies affecting population declines and range usage.
Subject: RA1 PD2 PD4 MA4 Area: B Source: ANNB

SH0336

Wishart, W.D. 1966.
Bighorn population and harvest study.
Wildl. Investigations Report, Alta. Fish and Wildl. Edmonton, Alberta.

Documents the sex and age structure, population numbers of bighorn sheep, and the location of 19 winter ranges in Alberta. This information is then related to the present harvest methods.
Subject: PD1 BE1 BE2 MA4 Area: B Source: AFWE

MORTALITY FACTORS (MF1)

SH0447

Brooks, A. 1923.
The Rocky Mountain sheep in British Columbia.
Can. Field Naturalist 37(2):23-25.

The range and location of sheep in British Columbia, as well as their enemies and diseases were discussed. The paper also refutes statements by Hewitt (1921).
Subject: MF1 MF3 RA1 RA4 Area: A Source: ANNB UOAL

SH0034

Buechner, H.K. 1960.
The bighorn sheep in the United States, its past, present and future.
Wildl. Monographs, No. 4. A publication of The Wildl. Society

A study of Rocky Mountain bighorn sheep (as well as other sheep species) in the United States. Discusses distribution, abundance, natality, mortality, natural regulation of numbers, and relationships to vegetation and other ungulates,
Subject: BE1 PD1 MF1 RA4 Area: B Source: CWSE

SH0400

Contor, R.J. 1958.
A survey of the bighorn sheep in Rocky Mountain National Park, Colorado.
On file, Office of the Park Ranger, Rocky Mountain National Park, Colorado.

This report follows Packard's efforts of 1939 and is a survey of bighorns in Rocky Mountain National Park. Overcrowding of wintering area was evident. Limiting factors such as food conditions, mineral deficiency, diseases and parasites, lungworms, coccidiosis, and Hemorraghic septicemia were mentioned. Early death of lambs due to predation by coyotes and cougar was noted.
Subject: MF1 MF3 MF4 PD3 Area: B Source: ANNB

SH0448

Couey, F.M. 1955.
Montana bighorn sheep.
Proc. 35th Annual Conf. of Western Assoc. of State Game and Fish Comm. 35:162-166.

Gave the present status, trapping and transplanting operations, mortality factors, and range conditions of bighorn sheep in Montana.
Subject: PD1 MA3 MF1 RA1 Area: B Source: ANNB

SH0470

Couey, F.M. et al. 1952.
Wildlife surveys and management.
F.A. Montana Project No. W-1-R. Helena, Montana.

Discusses the history, present distribution, populations, range use, moratality factors and management of the Sun River bighorn sheep herd in Montana.
Subject: PD1 BE2 MA3 MF1 Area: B Source: ANNB

SH0446

Game., British Columbia Fish and 1962.
Tragic death of mountain sheep.
Wildl. Rev. 2(10):6.

Pictures and describes a ram skull with a horn that had penetrated the lower jaw and caused the animal to starve.
Subject: MF1 Area: B Source: ANNB

SH0117

Green, H.U. 1949.
The bighorn sheep of Banff National Park.
Dept. Services Branch, National Parks and Historic Sites Service. Ottawa, Canada.

A general description of bighorn sheep at Banff National Park. Topics include range description, diseases and parasites, population, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: B Source: CWSE

SH0404

Harris, J.T. 1956.
Survey of the Poudre River bighorn herd.
Colorado Coop. Wildl. Res. Unit, Quarterly Report 10(2):25-33.

Discusses location of seasonal and critical ranges, physical description and condition and some mortality factors of bighorn sheep of the Poudre River Herd, Colorado.
Subject: BE2 MF1 Area: B Source: ANNB

SH0419

Kindel, F. et al. 1970.
Idaho game populations census and range study.
F.A. Idaho Project No. W-85-R. Boise, Idaho.

Gives detailed account of populations, mortality due to hunting, diseases and parasites, range condition, migration, and other causes of mortality of bighorn sheep in Idaho.
Subject: PD1 BE2 RA5 MF1 Area: B Source: ANNB

SH0186

Matthews, J.W. 1973.
Ecology of bighorn sheep on Wildhorse Island, Flathead Lake, Montana.
M.S. Thesis, Univ. of Montana. Missoula, Montana.

A study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana.

Mortality factors and methodologies for the study are outlined in detail.
Subject: RT4 BE2 BE3 MF1 Area: B Source: CWSE

SH0187

Meagher, M. 1982.
An outbreak of pinkeye in bighorn sheep, Yellowstone National Park : a preliminary report.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:198-201.

Documents the incidence of pinkeye caused by Chlamydia sp., in bighorn sheep in Yellowstone National Park, Wyoming. Includes a description of disease and distribution among ewes and rams. States that mortality due to the disease occurred because of impaired foraging and sheltering ability.
Subject: DP1 MF1 Area: B Source: AFWE

SH0407

Moran, P.J. 1928.
Bighorn sheep.
Can. Field Nat. 42(1):12-17.

Discusses in detail various mortality factors of bighorn sheep (Ovis canadensis, O. stonei and O. fannini). Mentions physical description and some habits.
Subject: MF1 MF3 MF4 Area: B Source: ANNB UOAL

SH0193

Moser, C.A. 1962.
The bighorn sheep of Colorado.
Technical Publication #10, Colorado Game and Fish Dept.

The paper is a good overview of the life of Colorado mountain sheep. Three main groups are studied : Dall, Stone and Rocky Mountain bighorn sheep. It gives clinical diagnoses for sheep which were found dead, and studies causes of die-offs in 1885, 1900 and 1923-24. Some methods of research are described.
Subject: DP1 MF1 MA1 PD2 Area: B Source: CWSE

SH0207

Ogren, H.A. 1954.
A population study of the Rocky Mountain bighorn sheep (Ovis canadensis canadensis Shaw) on Wildhorse Island.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

Documents population changes and distributions over four years of study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The success and failure of various techniques of marking are dicussed. Diseases and parasites affecting the animals are outlined as well, and related to mortality.
Subject: PD1 MF1 DP2 RT7 Area: B Source: ANNB

SH0211

Packard, F.M. 1946.
An ecological study of the bighorn sheep in Rocky Mountain National Park, Colorado.
J. Mammal. 27(1):3-28.

A general study of Rocky Mountain bighorn sheep in Colorado. Topics discussed include habitat, population distribution, ranges and mortality factors. Also included is a study of reasons for the population decline.
Subject: RA1 RA4 PD1 MF1 Area: B Source: CWSE

SH0214

Pengelly, L. 1970.
The biology and conservation of North American wild sheep.
Msc. Thesis, Univ. of Montana. Missoula, Montana.

Outlines management considerations in light of diseases, mortality factors, population dynamics and behavior, and range quality of six types of wild sheep in North America. The main study area is the United States.
Subject: MA1 DP1 MF1 PD1 Area: B Source: CWSE

SH0363

Potts, M. 1936.
Sixth annual wildlife report, Rocky Mountain National Park.
On file, Library of Rocky Mountain National Park. Colorado.

Describes the incidence of pneumonia and other diseases of Rocky Mountain bighorn sheep in Rocky Mountain National Park. Gives special reference to diseases inflicting lambs.
Subject: DP1 DP2 MF1 Area: B Source: ANNB

SH0258

Skipworth, J.P. 1974.
Ingestion of grit by bighorn sheep.
J. Wildl. Manage. 38(4):880-883.

Discusses the ingestion of grit as a possible contributor to mortality in bighorn sheep. The study area is Sheep River and the Palliser Range, Banff National Park, Alberta.
Subject: MF1 Area: B Source: UOAL

SH0264

Smith, D., W. Wishart and G. Lynch. 1977.
Bighorn ram movements at Cadomin, Alberta.
1975-76 Job Progress Report, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Summarizes results of a project to study movements of bighorn rams near Cadomin, Alberta. Documents the distance of ram movements, frequency and timing of these movements, proportion of rams involved, and some causes of sheep mortality. Specific habitats, and location of sheep winter ranges are also determined.
Subject: BE2 BE3 MF1 Area: B Source: AFWE

SH0261

Smith, I. and R. Demarchi. 1969.
Mountain sheep in British Columbia.
B.C. Fish and Wildl. Branch. Victoria, British Columbia.

A general description of mountain sheep in the Rocky Mountains of British Columbia. Topics include habitat, population distributions, behavior and

mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: A Source: KPWL

SH0262

Smith, K. 1975.
Radio telemetry as a means of studying mortality of bighorn sheep lambs (Ovis canadensis canadensis).

Proposes the use of radio telemetry as a tool for measuring Rocky Mountain bighorn lamb mortality, as it allows daily observation and examination of young, and a rapid detection of natality, morbidity and mortality. This method is also useful in determining lambing ranges.
Subject: MF1 RA5 RT7 Area: C Source: AFWE

SH0267

Spraker, T. 1976.
Capture myopathy in bighorn sheep.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:113-116.

Discusses incidence of three different clinical, but similar pathological features of an exertion myopathy encountered following transportation of Rocky Mountain bighorn sheep in South Dakota and Colorado. The three syndromes were characterized by acute death, ataxia and myoglobinuria, and bilateral rupture of the gastrocnemius muscles.
Subject: RT9 MF1 Area: B Source: AFWE

SH0282

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Canadian Rocky Mountain national parks, 1966-1971.
Can. Wildl. Serv. Edmonton, Alberta.

Documents die-offs, seasonal distributions, range conditions and diseases and parasites of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Relates these factors to animal conditions, reproduction and mortality.
Subject: PD2 RA1 DP1 MF1 Area: A Source: CWSE

SH0279

Stelfox, J.G. 1968.
Population dynamics and range ecology of bighorn sheep in Rocky Mountain national parks. Phase 1 : population fluctuations of bighorn sheep in the Canadian Rocky Mountains from 1800 to 1967.
Can. Wildl. Serv. Edmonton, Alberta.

The report gives a detailed history of population dynamics of bighorn sheep of the East slopes of the Rocky Mountains in Alberta. Environmental factors were analyzed in order to determine their role in the population fluctuations.
Subject: PD2 RA1 MF1 BE2 Area: A Source: CWSE

SH0308

Streeter, R.G. 1970.
A literature review on bighorn sheep population dynamics.
Special Report #24, Colorado Div. Game, Fish and Parks. Colorado.

Literature concerning the population dynamics of bighorn sheep (Ovis canadensis) is reviewed, synthesized and discussed under categories of population demography, breeding biology, nutrition, diseases and parasites, competition, predation and hunting.
Subject: BW PD1 DP1 MF1 Area: C Source: AFWE

SH0334

Wishart, W.D. 1958.
The bighorn sheep of the Sheep River Valley.
Unpub. MSc. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study conducted in the Sheep River Valley, Alberta. Topics included are food habits, various mortality factors, some seasonal movements, and management techniques.
Subject: MF1 BE2 NP2 MA1 Area: B Source: CWSE UOAL

SH0343

Wishart, W.D. 1980.
Bighorn sheep. In Big game of North America, ecology and management. pp 161-171. J.L. Schmidt and D.L. Gilbert, eds.
Stackpole Books. Harrisburg, Pennsylvania.

Discusses the general physical description, population dynamics, food habits, diseases and parasites, competition, predation and various management consideraions (harvesting, populations and habitat) of the four species of bighorn sheep inhabiting North America.
Subject: PD1 DP1 BE1 MF1 Area: B Source: AFWE.

SH0349

Woodard, T.N., R.J. Gutierrez and W.H. Rutherford. 1974.
Bighorn lamb production, survival, and mortality in southcentral Colorado.
J. Wildl. Manage. 38(4):771-774.

Study determined sheep distribution, lamb birth rate, survival and mortality of Rocky Mountain bighorn sheep herds in southcentral Colorado.
Subject: MF1 MF2 PD3 PD4 Area: B Source: UOAL CWSE

SH0348

Woodward, T., C. Hibler and B. Rutherford. 1972.
Bighorn lamb mortality investigations in Colorado.
Trans. 1972 North. Wild Sheep and Goat Counc., Hinton, Alberta. April 11-13, 1972:44-48.

Investigates bighorn sheep lamb mortality in Colorado. Causes are mostly related to disease, especially the pneumonia-lungworm complex.
Subject: MF1 DP1 DP2 Area: B Source: AFWE

HIGHWAY AND RAILWAY MORTALITY (MF2)

SH0123

Harrison, G., R. Hooper and P. Jacobson. 1982.
Ungulate population statistics and habitat analysis.
Natural History Research Div., Western Region, Parks Canada.

An investigation into the effect the Trans-Canada Highway has on ungulate mortality. The area of the highway studied is from the Banff National Park East gate to the Sunshine turn-off. In addition, the article briefly studies habitat and population distributions of elk, mule deer, white-tailed deer and bighorn sheep.
Subject: MF2 RA1 PD1 Area: B Source: KPWL

SH0325

Tighem, K. Van 1981.
Mortality of bighorn sheep (Ovis canadensis) on a railroad and highway in Jasper National Park, Canada.
Can. Wildl. Serv. Edmonton, Alberta.

Documents sheep mortality primarily on the C.N.R. and Yellowhead Highway in Jasper National Park. Some solutions in the way of management are given.
Subject: MF2 PD2 MA1 Area: B Source: CWSE

SH0349

Woodard, T.N., R.J. Gutierrez and W.H. Rutherford. 1974.
Bighorn lamb production, survival, and mortality in southcentral Colorado.
J. Wildl. Manage. 38(4):771-774.

Study determined sheep distribution, lamb birth rate, survival and mortality of Rocky Mountain bighorn sheep herds in southcentral Colorado.
Subject: MF1 MF2 PD3 PD4 Area: B Source: UOAL CWSE

PREDATION (MF3)

SH0021

Berryman, J.H. 1972.
The principles of predator control.
J. Wildl. Manage. 36(2):395-400.

Deals with the problems, solutions and methods of predator control, from a management viewpoint. Discusses where, when and how control should be employed, as well as the extent of practise, and the cost in implementing these controls.
Subject: MF3 MA1 Area: C Source: CWSE

SH0447

Brooks, A. 1923.
The Rocky Mountain sheep in British Columbia.
Can. Field Naturalist 37(2):23-25.

The range and location of sheep in British Columbia, as well as their enemies and diseases were discussed. The paper also refutes statements by Hewitt (1921).
Subject: MF1 MF3 RA1 RA4 Area: A Source: ANNB UOAL

SH0400

Contor, R.J. 1958.
A survey of the bighorn sheep in Rocky Mountain National Park, Colorado.
On file, Office of the Park Ranger, Rocky Mountain National Park, Colorado.

This report follows Packard's efforts of 1939 and is a survey of bighorns in Rocky Mountain National Park. Overcrowding of wintering area was evident. Limiting factors such as food conditions, mineral deficiency, diseases and parasites, lungworms, coccidiosis, and Hemorraghic septicemia were mentioned. Early death of lambs due to predation by coyotes and cougar was noted.
Subject: MF1 MF3 MF4 PD3 Area: B Source: ANNB

SH0492

Couey, F.M. 1950.
Rocky Mountain bighorn sheep of Montana.
Project 1-R, Montana Fish and Game Comm.

Complete description of the Sun River bighorn herd in Montana. Topics include history, distributions, range analysis, general behavior, predator relationships, and trapping and transplanting. A bibliography is included at the conclusion of the report.
Subject: BE2 PD5 RA1 MF3 Area: B Source: WNPL

SH0432

Cronemiller, F.P. 1948.
Mountain lion preys on bighorn.
J. Mammal. 29(1):68.

Documents incidence of mountain lions preying on bighorn sheep.
Subject: MF3 Area: B Source: ANNB UOAL

SH0057

Cunningham, E.B. 1970.
A Golden eagle harrassing bighorn sheep.
The Can. Field Naturalist 84:183.

Describes an incident of Golden Eagles harrassing bighorn sheep in Banff National Park.
Subject: MF3 Area: B Source: UOAL

SH0433

Elliot, H.N. 1961.
Bobcats and bighorn sheep.
Trans. Desert Bighorn Counc. 5:38-41.

Describes bobcat hunting techniques, capability of destroying bighorn sheep and control of bobcat numbers in order to save the sheep.
Subject: MF3 Area: B Source: ANNB UOAL

SH0434

Grinell, G.B. 1929.
Eagles' prey.
J. Mammal. 10(1):83.

Talks about predator-prey relationships between eagles and bighorn sheep.
Subject: MF3 Area: B Source: ANNB UOAL

SH0141

Hornocker, M.G. 1969.
Defensive behavior in female bighorn sheep.
J. Mammal. 50(1):128.

Describes an incident of female bighorn sheep defending a lamb from a bobcat in Idaho.
Subject: BE1 MF3 Area: B Source: UOAL

SH0142

Hornocker, M.G. 1972.
Predator ecology and management - what now?
J Wildl. Manage. 36(2):401-404.

Discusses how to go about a successful program of predator control. Topics include public education, alternatives to reduction control, and research.
Subject: MF3 MA1 Area: C Source: CWSE

SH0431

J.A., Blaisdell 1961.
Bighorn-cougar relationships.
Trans. Desert Bighorn Counc. 5:42.

Looks at a collection of quotations dealing with bighorn sheep and cougars and their effect on bighorn populations.
Subject: MF3 Area: B Source: ANNB UOAL

SH0195

McCabe, R.A. and E.L. Kozicky. 1972.
A position on predator management.
J. Wildl. Manage. 36(2):382-394.

Discusses the different considerations taken into account when determining management objectives with respect to predation. Includes recommendations for management. It also looks at the Leopold Report (Leopold, 1964).
Subject: MF3 MA1 Area: C Source: CWSE

SH0407

Moran, P.J. 1928.
Bighorn sheep.
Can. Field Nat. 42(1):12-17.

Discusses in detail various mortality factors of bighorn sheep (Ovis canadensis, O. stonei and O. fannini). Mentions physical description and some habits.
Subject: MF1 MF3 MF4 Area: B Source: ANNB UOAL

SH0250

Shank, C.C. 1977.
Cooperative defense by bighorn sheep.
J. Mammal. 58(2):243.

Describes the behavior of bighorn sheep when defending against coyotes. Observation took place in Banff National Park on the Palliser Range.
Subject: RA4 MF3 Area: B Source: CWSE UOAL

SH0425.

Shantz, H.L. 1939.
The bighorn and national forests.
Conservation 5(1):34-37.

Discusses predation, poaching and domestic sheep as contributing to the declining numbers of bighorn sheep in the national forests of the United States.
Subject: MF3 MF4 PD1 Area: B Source: ANNB

SH0427

Smith, D.R. 1955.
Management study of the Rocky Mountain bighorn sheep.
F.A. Idaho Project No. W-99-R.

Investigates the population declines of bighorn sheep in Idaho. Looks at the causes, techniques used for population dynamics, and gives management suggestions for halting the declines.
Subject: MA3 MF3 RT6 Area: B Source: ANNB

SH0476

Sperry, C.C. 1941.
Food habits of the coyote.
USDI Fish and Wildl. Serv. Wildl. Res. Bull. 4.

Looks at the relationship between bighorn sheep and coyotes.
Subject: RA4 MF3 Area: B Source: ANNB

SH0288

Stelfox, J.G. 1973.
Predator - prey relationships in Canadian national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Studies the relationships between various predators and their prey throughout Canadian National parks. The 'laissez faire' philosophy is looked at in relation to predator management.
Subject: MF3 Area: C Source: CWSE

HUNTING (MF4)

SH0400

Contor, R.J. 1958.
A survey of the bighorn sheep in Rocky Mountain National Park, Colorado.
On file, Office of the Park Ranger, Rocky Mountain National Park, Colorado.

This report follows Packard's efforts of 1939 and is a survey of bighorns in Rocky Mountain National Park. Overcrowding of wintering area was evident. Limiting factors such as food conditions, mineral deficiency, diseases and parasites, lungworms, coccidiosis, and Hemorraghic septicemia were mentioned. Early death of lambs due to predation by coyotes and cougar was noted.
Subject: MF1 MF3 MF4 PD3 Area: B Source: ANNB

SH0065

Demarchi, D.A. 1978.
Evolution of mountain sheep horn curl regulations in British Columbia.
Proc. of the 1978 North. Wild Sheep and Goat Conf., Penticton, British Columbia. April 2-4,1978:17-30.

Discusses the history of B.C.'s horn curl regulations for bighorn and other mountain sheep. Some management implications are considered in light of the existing regulations.
Subject: MA1 MF4 Area: A Source: AFWE

SH0079

Erickson, G.L. and J.J. McCarthy. 1976.
The Sun River bighorn sheep management plan.
Proc. Biennial Symp. of the North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:40-55.

Discusses management directions to be initiated to reduce the size of a sheep herd. Techniques mainly involved increased hunting according to the distributions of the sheep.
Subject: MA1 MF4 Area: B Source: AFWE

SH0110

Geist, V. 1970.
Sheep management dilemmas.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970: 46-49.

A study of various problems of bighorn sheep management. Hunting is given special consideration.
Subject: MA1 MF4 Area: B Source: CWSE

SH0133

Hickey, W.O. 1977.
Bighorn sheep ecology.
Idaho Dept. of Fish and Game, Project W160R4. Salmon, Idaho.

The report is broken down into four main areas of study : (1) classification of ranges by vegetation habitat type, and definition of food habits, (2)

movements, migrations, population dynamics of selected bighorn populations, (3) re-introduction as a management technique, and (4) evaluation of bighorn sheep hunting. The studies were conducted at various locations throughout Idaho.
Subject: BE2 NP2 MA3 MF4 Area: B Source: CWSE

SH0154

Hunter, G.N. and R.E. Pillmore. 1954.
Hunting as a technique in studying lungworm infestations in bighorn sheep.
Trans. Nineteenth North Amer. Wildl. Conf. March 8-10, 1954:116-131.

Investigates the possibility of using hunting as a technique in studying lungworm in Rocky Mountain bighorn sheep. Documents a study done using this method.
Subject: DP2 RT5 MF4 Area: B Source: CWSE

SH0418

Jones, F.L. 1960.
The esthetics of bighorn management.
Trans. Desert Bighorn Counc. 4:47-48.

Discusses the effects of hunting on bighorn sheep populations, and suggests management techniques to deal with problems in this area.
Subject: MF4 MA4 Area: B Source: ANNB UOAL

SH0407

Moran, P.J. 1928.
Bighorn sheep.
Can. Field Nat. 42(1):12-17.

Discusses in detail various mortality factors of bighorn sheep (Ovis canadensis, O. stonei and O. fannini). Mentions physical description and some habits.
Subject: MF1 MF3 MF4 Area: B Source: ANNB UOAL

SH0421

Morgan, J.K. 1970.
An analysis of the effects of ten years open season hunting on bighorn sheep population in Idaho.
Trans. North. Wild Sheep Counc. p. 34.

Gives an analysis of the effects of having open season hunting on bighorn sheep populations in Idaho. Some management alternatives are given to reduce negative effects of the hunting.
Subject: MF4 MA4 Area: B Source: ANNB AFWE

SH0217

Pillmore, R.E. 1954.
Report on the bighorn.
Colorado Conservation 3(1):19-21.

Discusses the hunting season with respect to (1) relief of concentrations of bighorn sheep apparently responsible for a lungworm epidemic, and (2) removal of surplus rams for a more favorable sex ratio. Includes documented incidence of lungworm. The study area is Colorado.
Subject: DP2 MA3 MF4 Area: B Source: UABA

SH0422

Pillmore, R.E. 1958.
Buffalo Peaks bighorn seasons.
Outdoor Facts #11, Colorado Game, Fish and Parks Game Information Leaflet.

Outlines the Buffalo Peaks bighorn seasons from 1953-1958. A description of diseases and parasites found in the animals id given.
Subject: MF4 MA4 Area: B Source: ANNB

SH0233

Rutherford, W.H. 1970.
Bighorn sheep - what is optimum harvest?
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970: 50-54.

An essay covering the problems of management and hunting for general bighorn sheep populations.
Subject: MA1 MF4 Area: A Source: CWSE

SH0237

Schallenberger, A. 1972.
Management and research on bighorn sheep, Sun River Area, Montana.
Trans. North. Wild Sheep Conf., Hinton, Alberta. April 11-13, 1972:2-14.

Documents and discusses harvest by hunters and transplanting of bighorn sheep in the Sun River Area, Montana. The success of transplanting as a management technique is also discussed.
Subject: MA3 MF4 Area: B Source: CWSE

SH0425.

Shantz, H.L. 1939.
The bighorn and national forests.
Conservation 5(1):34-37.

Discusses predation, poaching and domestic sheep as contributing to the declining numbers of bighorn sheep in the national forests of the United States.
Subject: MF3 MF4 PD1 Area: B Source: ANNB

SH0263

Smith, K. and W. Wishart. 1977.
Ram Mountain bighorn sheep study progress report - 1976.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Discusses the effects of orphaning bighorn lambs on Ram Mountain, Alberta. Positive and negative aspects of the non-trophy season, distributions and movements of the sheep, and factors influencing this are also discussed.
Subject: PD3 PD4 BE2 MF4 Area: B Source: AFWE

SH0265

Smith, K.G. and W.D. Wishart. 1978.
Further observations of bighorn sheep non-trophy seasons in Alberta and their management implications.
B.C. Fish and Wildl. Branch. Okanagan Game Farm, British Columbia.

Examines the questions : (1) What effect does orphaning have on the survival and growth of the lambs , and (2) how does this influence the population dynamics of a bighorn herd. The specific herd studied is from Ram Mountain , Alberta.
Subject: MA1 MF4 Area: B Source: AFWE

SH0272

Stelfox, J.G. 1966.
Bighorn and Rocky Mountain goat populations, reproductions, harvests and proposed 1966 seasons.
Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents population, reproduction and harvests of bighorn sheep and Rocky Mountain goats in the Coalbranch region, Alberta. Range condition, trend, and climates are discussed for this area. Some management considerations with respect to harvesting are also outlined.
Subject: PD4 RA2 MA1 MF4 Area: B Source: CWSE

SH0314

Thorne, E.T., T. Varcalli K. Becker and G.B. Butler. 1978.
Some thoughts on the consequences of non-trophy sheep hunting in the Wind River Mountains of Wyoming.
Proc. 1978 North. Wild Sheep and Goat Conf., Penticton, B.C. 1978:41-52.

Discusses various consequences, advantages and disadvantages of non-trophy sheep hunting in the Wind River Mountains of Wyoming. Sheep considered are Rocky Mountain bighorn sheep.
Subject: MA1 MF4 Area: B Source: AFWE

SH0339

Wishart, W.D. 1975.
Non-trophy sheep harvest summary 1966-74.
Alta. Fish and Wildl. Edmonton, Alberta.

For each region, the hunting success, based on the annual kill and total number of permits given, is outlined. The ages of the non-trophy sheep as outlined by the hunters on questionnaires are given as well. The study area is various locations in Alberta.
Subject: MA1 MF4 Area: B Source: AFWE

SH0338

Wishart, W.D. 1970.
When and why it is good management to shoot bighorn ewes and lambs.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970: 56-60.

A paper covering general management of bighorn sheep in various areas. Deals specifically with man's harvesting of ewes and lambs.
Subject: MA1 MF4 Area: A Source: CWSE

NUTRITION (NP1)

SH0124

Hebert, D.M. 1972.
Difference between years and nutrient cycles.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972: 15-20.

Relates growth of Rocky Mountain bighorn sheep to nutrition in diet and the climate of their ranges.
Subject: RA6 PD3 PD4 NP1 Area: A Source: KPNL

SH0126

Hebert, D.M. 1973.
Altitudinal migration as a factor in the nutrition of bighorn sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

A documented account detailing the nutrition of Rocky Mountain bighorn sheep in an area centered in the Rocky Mountain Trench between Elko and Premier Ridge. Outlines diet in various areas, including an analysis of nutrients. The results include research techniques employed while studying animal trials and simulated altitudinal migration, as well as the outcome of these experiments on the sheep. The paper is very specific on details regarding the subject matter.
Subject: BE2 BE3 RT9 NP1 Area: A Source: UBCL

SH0127

Hebert, D.M. 1974.
The effect of ambient temperatures in the winter feed intake of bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep Counc., Great Falls ,Montana. April 23-25, 1974:80-90.

Paper relates temperature to winter feed intake of bighorn sheep.
Subject: NP1 PD5 NP2 Area: A Source: CWSE

SH0129

Hebert, D.M. 1978.
Blood chemistry as an indicator of nutritional condition in bighorn sheep.
Proc. 1978 North. Wild Sheep and Goat Conf., Penticton, B.C. April 2-4, 1978:365-388.

The paper explores the relationship between BUN, serum cholesterol, hematocrit and hemoglobin, and a host of nutritional measurements conducted under controlled conditions, at or below maintenance. The study was conducted in the East Kootenay region of British Columbia.
Subject: NP1 RT9 Area: A Source: AFWE

SH0169

Lacey, E.N. 1976.
The management, care and propogation of captive North American mountain sheep.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Jackson, Wyoming. Feb. 10-12, 1976:125-130.

The controlled management, nutrition, capture and transport of Dall, Stone, Rocky Mountain bighorn and California bighorn sheep are discussed. Observations on breeding, disease and behavior of the mountain sheep in captivity are cited. Studies were conducted at the Okanagan Game Farm, British Columbia.
Subject: RT7 MA1 NP1 Area: C Source: AFWE

FOOD HABITS (NP2)

SH0001

Adams, L.G., K.L. Risenhoover and J.A. Bailey. 1982.
Ecological relationships of mountain goats and Rocky Mountain bighorn sheep.
North. Wild Sheep and Goat Counc., Proc. of the Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:9-21.

Discusses the competition between mountain goats and bighorn sheep after mountain goats were introduced into Colorado. Their ecological relationships and adaptations are also discussed. Management considerations are included.
Subject: BE3 NP2 RA4 MA1 Area: B Source: AFWE

SH0397

Banfield, A.W.F. 1947.
The mammals of Waterton Lakes National Park, 1947.
Can. Wildl. Serv. Wildl. Manage. Bull. Series 1, No. 1. p. 11.

Documents die-offs due to pneumonia, sex and age ratios, condition and distribution, and food habits of bighorn sheep in Waterton Lakes National Park.
Subject: DP1 BE2 NP2 Area: B Source: CWSE ANNB

SH0387

Blood, D.A. 1967.
Food habits of the Ashnola bighorn sheep herd.
Can. Field Nat. 81(1):23-29.

Gives a detailed outline of the forage preferences of bighorn sheep of the Ashnola herd. The percentages of each species making up the diet of the animals were outlined.
Subject: NP2 Area: B Source: ANNB UOAL

SH0030

Bodie, W.L. and W.O. Hickey. 1980.
Response of wintering bighorn sheep to a rest-rotation grazing system in central Idaho.
Proc. Biennial Symp. of the North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:60-69.

Documents changes in the sex and age structure of bighorn sheep populations, using winter ranges grazed season-long by domestic livestock and ranges with a rest-rotation grazing system in the Morgan Creek area of central Idaho.
Subject: RA4 NP2 MA1 Area: B Source: AFWE

SH0032

Brown, G.W. 1974.
Distribution and population characteristics of bighorn sheep near Thompson Falls in northwestern Montana.
MSc. Thesis, The Univ. of Montana. Missoula, Montana.

Outlines distribution, population dynamics, general behavior and diseases of bighorn sheep near Thompson Falls, northwestern Montana. Included are research techniques used in obtaining the data.
Subject: RT6 BE2 NP2 DP2 Area: B Source: CWSE

SH0033

Bruggemann, J., D. Giesicke and K. Walser-Karst. 1968.
Methods for studying microbial digestion in ruminants post mortem with special reference to wild species.
J. Wildl. Manage. 32(1):198-205.

Outlines the techniques for the analysis of the digestive processes of wild ruminants. This technique gives information on food selection and digestive processes. Topics covered are: digestive tract dimensions, botanical and chemical analysis of the digesta, volatile fatty acids and microbial populations.
Subject: RT9 NP2 Area: C Source: CWSE

SH0037

Capp, J.C. 1967.
Competition among bighorn sheep, elk, and deer in Rocky Mountain National Park, Colorado.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Discusses the vegetative composition and climate of the range, and the usage by various species of ungulates. The seasonal movements and distributions, occupancy of habitat types, and food preferences for each of sheep, elk and deer in Rocky Mountain National Park, Colorado, are given. Competition for range among these three ungulates is analyzed in terms of the above.
Subject: RA4 RA6 BE3 NP2 Area: B Source: CWSE

SH0044

Constan, K.J. 1972.
Winter foods and range use of three species of ungulates.
J. Wildl. Manage. 36(4):1068-1076.

Documents range use, food habits, population characteristics and interspecific relationships of bighorn sheep, mule deer and elk on the Deer Creek - Asbestos Creek winter-spring range in Gallatin Canyon, Montana.

Subject: RA4 PD1 BE3 NP2 Area: B Source: UOAL

SH0043

Constan, K.J. 1967.
Bighorn sheep range use, food habits and relationships to mule deer and elk in Gallatin Canyon.
Montana Fish and Game Dept.

Detailed description of range use, food habits and interspecific relationships of bighorn sheep, mule deer and elk. Some research techniques were also included.
Subject: RA4 BE3 NP2 RT4 Area: B Source: CWSE

SH0049

Cooperrider, A.Y., S.A. McCollough and J.A. Bailey. 1980.
Variation in bighorn sheep food habits as measured by fecal analysis.
The 1980 North. Wild Sheep and Goat Conf., Salmon, Idaho. April 23-25, 1980:29-41.

Discusses the technique of using fecal analysis to determine food habits of bighorn sheep.
Subject: NP2 RT4 Area: C Source: CWSE

SH0050

Cooperrider, E.B. and R.M. Hansen. 1982.
Forage selection by bighorn sheep ewes and lambs in southcentral Colorado.
The Third Biennial Symp. of the North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:262-277.

Documents summer food habits of Rocky Mountain bighorn sheep ewes and lambs on two lambing ranges in southcentral Colorado. Compares the diets to botanical composition and herbage production of each area.
Subject: BE3 NP2 Area: B Source: AFWE

SH0415

Couey, F.M. 1966.
Rocky Mountain bighorn of Montana.
Montana Fish and Game Comm. Bull. 2.

Topics include: the early history of bighorns and their extent in North America, history and present distribution in Montana, the Sun River bighorn herd - its location and history, distribution and numbers, age classes and sex ratios, E:L ratios, life habits, forage utilization, range use, parasites and disease, predator relationships, recreational use in the area of the herd, and trapping and transplanting of these bighorn.
Subject: PD5 PD4 NP2 RA3 Area: B Source: ANNB

SH0052

Cowan, I.McT. 1947.
Range competition between mule deer, bighorn sheep and elk in Jasper Park,. Alberta.
Trans. of the Twelfth North Amer. Wildl. Conf., San Antonio, Texas. Feb. 3-5, 1947:223-227.

Discusses competition with respect to forage preferences of mule deer, bighorn

sheep and elk in Jasper National Park, Alta. Documents types of plants, and the percentage of total feed for the animals.
Subject: RA4 NP2 Area: B Source: UOAL

SH0058

Dale, A.R. and J.A. Bailey. 1982.
Application of optimal foraging theory for bighorn sheep habitat evaluation.
Third Biennial Symp. of the North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:254-261.

Describes a method for measuring forage efficiency of bighorn sheep in Waterton Canyon, Colorado. The method uses the optimal foraging theory and relates it to the distribution and sizes of potential bites, and availability for efficient harvest by bighorns.
Subject: RA2 BE3 NP2 RT4 Area: B Source: AFWE

SH0416

Demarchi, R.A. 1965.
An ecological study of the Ashnola bighorn winter ranges.
MSc. Thesis, Univ. of British Columbia. Vancouver, British Columbia.

Investigates the composition, floral phenology, productivity, utilization and soils of the Ashnola bighorn winter range. Includes discussion of the effects of overgrazing by bighorn and cattle.
Subject: RA2 RA3 RA6 NP2 Area: B Source: ANNB

SH0501

Eastman, D.S. 1972.
Current knowledge of ungulate competition in southern British Columbia. In Interactions between cattle and wild ungulates in southern B.C., J.E. Miltmore, ed.
Proc. Informal Work Planning Meeting, Kamloops, B.C. Sept. 28-29, 1972: 40-51.

Discusses wild-domestic ungulate competition in various regions of southern B.C. Gives a list of measurements which must be obtained in order to determine the level of competition. Management suggestions are made for decreasing the level of competition.
Subject: RA4 NP2 MA2 Area: B Source: LARS

SH0097

Franzmann, A.W. and D.M. Hebert. 1971.
Variation in rectal temperature in bighorn sheep.
J. Wildl. Manage. 35(3):488-494.

Documents the technique of taking rectal temperatures of bighorn sheep. Found that the factors affecting this temperature are excitability, diet and ambient temperatures. The study was conducted on 6 different groups of sheep from western North America (including Banff, Penticton and Wasa, B.C.).
Subject: RT9 NP2 Area: B Source: CWSE

SH0098

Franzmann, A.W. and E.T. Thorne. 1970.
Physiologic values in wild bighorn sheep (Ovis canadensis canadensis) at capture, after handling, and after captivity.
J. Amer. Vet. Med. Assoc. 157(5):647-650.

Documents physiologic values in Rocky Mountain bighorn sheep at capture, after handling and after captivity. The various physiological methods used were : rectal temperature, heart rate, BUN, cholesterol, glucose, serum, total protein, magnesium, calcium, phosphorous and hemoglobin. The study objective was to determine the effect of captivity on the physiology of the sheep. Detailed technique outlines are given. The study area is Wyoming.
Subject: NP2 RT7 Area: B Source: AFWE

SH0388

Halloran, A.F. and H.B. Crandell. 1953.
Notes on bighorn feed in the Sonoran Zone.
J. Wildl. Manage. 17(3):318-320.

The author listed fifty-two plants fed upon by bighorns in Arizona. Twenty species were preferred.
Subject: NP2 Area: B Source: ANNB UOAL

SH0127

Hebert, D.M. 1974.
The effect of ambient temperatures in the winter feed intake of bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep Counc., Great Falls ,Montana. April 23-25, 1974:80-90.

Paper relates temperature to winter feed intake of bighorn sheep.
Subject: NP1 PD5 NP2 Area: A Source: CWSE

SH0125

Hebert, D.M. 1972.
Forage and serum phosphorous values for bighorn sheep.
J. Range Manage. 25(4):292-296.

Documents forage and serum phosphorous values for winter and summer range forages in the East Kootenay region of British Columbia. Sheep studied were Rocky Mountain bighorn.
Subject: RA3 NP2 Area: A Source: KPNL CWSE

SH0133

Hickey, W.O. 1977.
Bighorn sheep ecology.
Idaho Dept. of Fish and Game, Project W160R4. Salmon, Idaho.

The report is broken down into four main areas of study : (1) classification of ranges by vegetation habitat type, and definition of food habits, (2) movements, migrations, population dynamics of selected bighorn populations, (3) re-introduction as a management technique, and (4) evaluation of bighorn sheep hunting. The studies were conducted at various locations throughout Idaho.
Subject: BE2 NP2 MA3 MF4 Area: B Source: CWSE

SH0132

Hickey, W.O. 1973.
Bighorn sheep ecology, job progress report.
Idaho Fish and Game Dept. Salmon, Idaho.

A report on vegetation, habitat, seasonal movements and distributions, and population dynamics of bighorn sheep in Idaho.
Subject: BE2 BE3 NP2 PD1 Area: B Source: CWSE

SH0135

Hoffmann, W.H. 1973.
Dall sheep rumen content analysis.
Can. Wild. Serv. Edmonton, Alberta.

Gives a detailed description of how rumen content analysis can be used to obtain dietary composition information.
Subject: NP2 RT11 Area: C Source: CWSE

SH0160

Johnston, A., L.M. Bezeau and S. Smoliak. 1968.
Chemical composition and in vitro digestibility of alpine tundra plants.
J. Wildl. Manage. 32(4):773-777.

Documents the chemical composition and in vitro digestibility of various plant species of the alpine tundra. The study area was a Rocky Mountain bighorn sheep summer range in southwestern Alberta.
Subject: NP2 RT12 Area: B Source: UOAL

SH0168

Krueger, W.C. 1972.
Evaluating animal forage preference.
J. Range Manage. 25(6):471-475.

Describes in detail the methods used for and results of determining sheep forage preferences on a summer range in southwestern Montana.
Subject: NP2 RT4 RT12 Area: B Source: CWSE

SH0175

Lauer, J.L. and J.M. Peek. 1976.
Big game - livestock relationships on the bighorn sheep winter range, east fork, Salmon River, Idaho.
Bureau of Land Management, United States Dept. of the Interior. Moscow, Idaho.

Detailed analysis of food habits, range vegetation and competition between bighorn sheep and livestock on the sheep winter range, east fork of Salmon River, Idaho.
Subject: RA4 BE3 NP2 Area: B Source: CWSE

SH0176

Lawson, B. and R. Johnson. 1983.
Mountain sheep (Ovis canadensis and Ovis dalli). In Chapman, J.A. and G.A. Feldhamer, eds. Wild mammals of North America - biology, management and economics.
The John Hopkins Univ. Press. Baltimore, Maryland.

Discusses general disribution, physical description, physiology, reproduction, ecology of range, food habits, behavior, mortality factors (including diseases and parasites), a list of gastrointestinal nematodes of wild sheep, age determination, population dynamics and management considerations for thinhorn and bighorn sheep in North America.
Subject: DP1 MA1 NP2 RA1 Area: B Source: AFWE

SH0406

McCann, L.J. 1956.
Ecology of the mountain sheep.
Amer. Midland Nat. 56:297-324.

Discussed: classification and distribution, physical characteristics, evolutionary implications, origin and recent history in North America, the Gros Ventre sheep range, behavior observations, herd organization and movements , food habits, natural enemies, accidents, parasites and disease, competition.
Subject: BE2 NP2 PD1 PD5 Area: B Source: ANNB

SH0495

Morgan, J.K. 1969.
Rocky Mountain bighorn sheep investigations.
Idaho Fish and Game Job Completion Report for Job W-85-R-19, #2.

Discusses population, movements and migrations, competition with other species, and food habits for the Morgan Creek bighorn sheep herd, Idaho. Management methods for both sheep and range, and further study recommendations are given. Some growth rates and productivity figures are included.
Subject: BE2 NP2 RA4 Area: B Source: WNPL

SH0209

Oldemeyer, J.L., W.J. Barmore and D.L. Gilbert. 1971.
Winter ecology of bighorn sheep in Yellowstone National Park.
J. Wildl. Manage. 35(2):257-269.

Studies the range condition, vegetation, competition for food on the winter range, and the population and distribution of Rocky Mountain bighorn sheep in Yellowstone National Park.
Subject: RA4 BE2 BE3 NP2 Area: B Source: CWSE

SH0410

Potts, M.K. 1941.
A second report upon the status of bighorn in Rocky Mountain Park.
On file, Office of Chief Park Ranger. Rocky Mountain National Park, Colorado.

This was a continued report of the status of bighorn sheep in Rocky Mountain National Park. A study was completed to determine the number, distribution, and ranges of the bighorn. Two pneumonia bacteria, Pasteurella oviseptica and Corynebacterium pyogenes, were mentioned....The paper also dealt with the habitat and ranges of the animals.
Subject: DP2 BE3 NP2 Area: B Source: ANNB

SH0232

Rominger, E.M. and J.A. Bailey. 1982.
Forage preference indices : adjusting forage availability data for habitat selection.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:278-286.
Subject: BE3 NP2 RT4 Area: B Source: AFWE

SH0389

Schallenberger, A.D. 1965.
Food habits, range use and interspecific relationships of bighorn sheep in the Sun River Area, west-central Montana.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

The purpose of the research was to get quantitative data on winter use of the range by bighorn sheep to aid in evaluation of range relationships among species. Outlines the seasonal food habits of sheep, and discusses competition with other species, in particular, elk.
Subject: NP2 RA4 RA5 Area: B Source: ANNB

SH0252

Shepherd, H.R. 1975.
Vegetation of two dissimilar bighorn sheep ranges in Colorado.
Colorado Div. Wildl., Project W-101-R.

Provides basic habitat and vegetational information useful in appraising results of food habits, nutrition and disease studies. Ecological descriptions of study areas, and details of the study methods are given. Detailed analysis of the habitat types for each of the winter, intermediate and lambing ranges are given for each area. Study areas are the Trickle Mountain and Buffalo Peaks Areas, Colorado.
Subject: RA5 RA6 BE3 NP2 Area: B Source: AFWE

SH0358

Simmons, N.M. 1961.
Daily and seasonal movements of Poudre River bighorn sheep.
Unpub. MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Daily and seasonal movements were related to weather changes, topographic characteristics, vegetative characteristics, presence of other species, and availability of food, water and minerals, Most observations were of adult ewe, yearling, lamb groups.
Subject: BE2 BE3 NP2 Area: B Source: ANNB

SH0257

Singleton, J. 1976.
Food habits of wild ungulates in British Columbia : bibliography and plant synopsis.
B.C. Fish and Wildl. Branch.

Describes food habits of moose, elk, deer, mountain goats and bighorn and thinhorn sheep in British Columbia. Included is a bibliography for each animal as well as a plant synopsis for each habitat.
Subject: BE3 NP2 BW Area: A Source: CWSE

SH0305

Stewart, S.T. 1975.
Ecology of the West Rosebud and Stillwater bighorn sheep herds, Beartooth Mountains, Montana.
Project W-120-R-6 and 7, Statewide Wildl. Research, State of Montana.

Studies population, range use, food habits and movements of bighorn sheep in the Beartooth Mountains, Montana. Documents habitat types, total standing crop of forage and protein content of principle forage species in order to evaluate possible effects on the bighorn sheep.
Subject: RA3 BE2 BE3 NP2 Area: B Source: AFWE

SH0316

Todd, A.W. 1972.
A literature review on bighorn sheep food habits.
Colorado Div. Game, Fish and Parks.

Discusses bighorn food habits in some detail. An extensive bibliography on bighorn range ecology and forage preferences is also included.
Subject: BW NP2 Area: B Source: CWSE

SH0318

Todd, J.W. and R.M. Hansen. 1973.
Plant fragments in the feces of bighorns as indicators of food habits.
J. Wildl. Manage. 37(3):363-366.

Discusses the utilization of fecal analysis to determine food habits of bighorn sheep in Colorado.
Subject: NP2 RT11 Area: B Source: CWSE

SH0317

Todd, J.W. and R.M. Hansen. 1973.
Diets of bighorn sheep near Saguache, Colorado.
Colorado State Univ. Fort Collins, Colorado.

Summarizes the diets of bighorn sheep at the Sheep Creek - Trickle Mountain region in Sagauche County, Colorado.
Subject: NP2 Area: B Source: CWSE

SH0334

Wishart, W.D. 1958.
The bighorn sheep of the Sheep River Valley.
Unpub. MSc. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study conducted in the Sheep River Valley, Alberta. Topics included are food habits, various mortality factors, some seasonal movements, and management techniques.
Subject: MF1 BE2 NP2 MA1 Area: B Source: CWSE UOAL

SH0351

Woolf, A. 1968.
Summer ecology of bighorn sheep in Yellowstone National Park.
Unpub. MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents population size and distribution of bighorn sheep in Yellowstone

National Park. The dominant plant and staple foods and potential elk competition is discussed.
Subject: BE2 NP2 RA4 Area: B Source: ANNB

SH0390

Yoakum, J. 1964.
Bighorn food habit - range relationships in the Silver Peak range, Nevada.
Trans. Desert Bighorn Counc. 8:95-102.

Gives the percentage of grass, forbs and browse in the diets of sheep in the Silver Peak Range of Nevada. The data is then combined with other available data to get averages for the herd.
Subject: NP2 Area: B Source: ANNB UOAL

PHYSIOLOGY (NP3)

SH0094

Franzmann, A.W. 1971.
Comparative physiologic values in captive and wild bighorn sheep.
J. Wildl. Diseases 7(2):105-108.

Documents and compares physiologic values of captive and wild bighorn sheep. Animals were taken from Alberta, Montana and Wyoming.
Subject: NP3 RT9 Area: B Source: UOAL

SH0095

Franzmann, A.W. 1972.
Environmental sources of variation of bighorn sheep physiologic values.
J. Wildl. Manage. 36(3):924-932.

Documents the techniques used and the results obtained for the study of physiologic values of bighorn sheep from British Columbia, Alberta, Wyoming, Montana and Washington. Illustrates how physiologic values can be used to determine environmental conditions.
Subject: NP3 PD5 RT9 Area: B Source: CWSE

SH0329

Whitehead, P.E. and E.H. McEwan. 1980.
Progesterone levels in peripheral plasma of Rocky Mountain bighorn ewes (Ovis canadesis) during the estrous cycle and pregnancy.
Can. J. Zool. 58(6):1105-1108.

Describes the progesterone level of ewes during anestrus, estrus and throughout pregnancy. The ewes were taken from Jasper National Park, Alberta.
Subject: NP3 PD4 Area: B Source: CWSE

BIOENERGETICS (NP4)

SH0039

Chappel, R.W. 1976.
Bioenergetics of Rocky Mountain bighorn sheep.
The Univ. of Alberta. Edmonton, Alberta.

Outlines the theory and the bioenergetics of bighorn sheep, and how it shows a pattern of animal response to the environment. Discusses methodology and procedures in some detail. The study was carried out at the University of

Alberta.
Subject: NP4 RT10 Area: A Source: CWSE

SH0041

Chappel, R.W. and R.J. Hudson. 1978.
Prediction of energy expenditures by Rocky Mountain bighorn sheep.
The Proc. of the 1978 North. Wild Sheep and Goat Conf., Penticton, British Columbia. April 2-4, 1978:388-407.

Investigates various factors influencing the metabolic rate of Rocky Mountain bighorn sheep in Jasper National Park. A predictive equation based on the measurement of energy expenditures of bighorn sheep under a variety of conditions throughout the winter season was presented.
Subject: NP4 PD5 Area: B Source: AFWE

SH0040

Chappel, R.W. and R.J. Hudson. 1976.
Procedures and preliminary results on bioenergetics of bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:14-21.

This research was directed toward disclosing the energy budgets of Rocky Mountain bighorn sheep on an over-winter basis, utilizing the relationship between oxygen consumption, carbon dioxide production, and metabolic rate. In addition the study explored the effect of various stress factors such as cold, wind and fasting on energy expenditure and requirements.
Subject: RT10 NP4 Area: C Source: AFWE

SH0367

MacArthur, R.A., V. Geist and R.H. Johnston. 1982.
Cardiac and behavioral responses of mountain sheep to human disturbance.
J. Wildl. Manage. 46(2):351-358.

Documents telemetered heart rates (HR) and behavioral responses of mountain sheep (Ovis canadensis canadensis) reacting to human disturbance in the Sheep River Wildlife Sanctuary, southwestern Alberta. The use of HR telemetry in harrassment research is discussed as well.
Subject: NP4 PD5 RT7 Area: B Source: UOAL

POPULATION DYNAMICS (PD1)

SH0005

Amundson, G.A. 1942.
The bighorn sheep.
Arizona Wildl. and Sportsman 1(9).

A resume of present status of mountain sheep (Ovis canadensis spp.) in the western U.S., and suggested management practises.
Subject: PD1 MA1 Area: B Source: UABA

SH0014

Barmore, W.J. 1962.
Bighorn sheep and their habitat in Dinosaur Monument.
MSc. Thesis, Utah State Univ. Logan, Utah.

Describes the ecology, condition, utilization and geography of the Dinosaur Monument sheep range. Bighorn sheep population dynamics and some diseases are described as well. Management considerations are included.
Subject: RA2 RA3 BE3 PD1 Area: B Source: ANNB

SH0020

Berger, J. 1980.
The ecology, structure and functions of social play in bighorn sheep (Ovis canadensis).
J. Zoology, London. 192:531-542.

Relates differing social play behavior to differing habitat for California and Rocky Mountain bighorn sheep, and Stone and Dall sheep.
Subject: PD1 BE1 BE3 Area: C Source: UOAL

SH0022

Bibaud, A. and A. Dialman. 1980.
Region 4 sheep survey.
Alberta Energy and Natural Resources. Edmonton, Alberta.

An aerial survey of 14 designated winter ranges was flown in the Edson region between Jan. 7-17, 1980. The objective of the survey was to locate, count and classify bighorn sheep herds on designated winter ranges. The results were compared to those of 1978.
Subject: BE1 BE2 PD1 Area: B Source: AFWE

SH0026

Blood, D.A. 1966.
Progress report on bighorn sheep investigations in the Rocky Mountain national parks.
Canadian Wildlife Service. Edmonton, Alberta.

A study investigating population dynamics and herd composition in Waterton and Jasper national parks. Included is data pertaining to contagious ecthyma in bighorn sheep in Banff, Jasper, Waterton, Kootenay and Glacier national parks.
Subject: PD1 PD4 RT6 DP1 Area: A Source: CWSE

SH0491

Brady, K.S. 1975.
A report on wildlife numbers and distribution. Period covered : Jan. 1974 -Feb. 1975 - Waterton Lakes National Park.
Compiled for Waterton Lakes Nat. Park Warden Service.

Documents the results of a wildlife census and distibution survey conducted in Waterton Lakes National Park during the period from Jan. 1974 to Feb. 1975. Results are included in both discussion and table form. Methodology is given some discussion.
Subject: BE2 PD1 RT6 Area: B Source: AFWL

SH0490

Brady, K.S. D = 1973
Ungulate abundance and distribution, Waterton Lakes National Park.
Compiled for Waterton Lakes Nat. Park Warden Service.

This is a report on the abundance and distribution of ungulates in Waterton Lakes National Park covering the period from March, 1971 to November, 1973, inclusive....A total of six ungulate species are dealt with in the report under subheadings in regard to status, distribution and habitat preference, followed by general remarks.
Subject: BE2 BE3 PD1 Area: B Source: AFWL

SH0034

Buechner, H.K. 1960.
The bighorn sheep in the United States, its past, present and future.
Wildl. Monographs, No. 4. A publication of The Wildl. Society

A study of Rocky Mountain bighorn sheep (as well as other sheep species) in the United States. Discusses distribution, abundance, natality, mortality, natural regulation of numbers, and relationships to vegetation and other ungulates,
Subject: BE1 PD1 MF1 RA4 Area: B Source: CWSE

SH0398

Buechner, H.K. 1956.
The future of the bighorn sheep.
Animal Kingdom 59(1):2-10.

The author censused bighorns by aerial counts. Herds in various states were described and a graph was pesented of the present status of the sheep in the United States. Discusses reasons and results of die-offs, and considers harvesting as a means of population control.
Subject: PD2 PD1 Area: B Source: ANNB

SH0044

Constan, K.J. 1972.
Winter foods and range use of three species of ungulates.
J. Wildl. Manage. 36(4):1068-1076.

Documents range use, food habits, population characteristics and interspecific relationships of bighorn sheep, mule deer and elk on the Deer Creek - Asbestos Creek winter-spring range in Gallatin Canyon, Montana.
Subject: RA4 PD1 BE3 NP2 Area: B Source: UOAL

SH0448

Couey, F.M. 1955.
Montana bighorn sheep.
Proc. 35th Annual Conf. of Western Assoc. of State Game and Fish Comm. 35:162-166.

Gave the present status, trapping and transplanting operations, mortality factors, and range conditions of bighorn sheep in Montana.
Subject: PD1 MA3 MF1 RA1 Area: B Source: ANNB

SH0470

Couey, F.M. et al. 1952.
Wildlife surveys and management.
F.A. Montana Project No. W-1-R. Helena, Montana.

Discusses the history, present distribution, populations, range use, moratality factors and management of the Sun River bighorn sheep herd in Montana.
Subject: PD1 BE2 MA3 MF1 Area: B Source: ANNB

SH0051

Cowan, I.McT. 1940.
Distribution and variation in the native sheep of North America.

Describes the history, distribution, physical characteristics, and variations within the genus Ovis. Physical and geographic locations and the numbers of wild sheep in North America are outlined.
Subject: PD1 BE1 BE2 Area: B Source: AFWE

SH0053

Cowan, I.McT. 1950.
Some vital statistics of big game on overstocked mountain range.
Trans. of the Fifteenth North Amer. Wildl. Conf., San Francisco, California. March 6,7,9, 1950:581-588.

Outlines the sex ratios, fertility and effective reproduction of big game animals on overstocked mountain ranges in Jasper, Banff, Kootenay and Yoho national parks. Includes a description of range vegetation and utilization.
Subject: PD1 PD4 RA3 BE3 Area: A Source: UOAL

SH0059

Davis, W.B. and W.P. Taylor. 1939.
The bighorn sheep of Texas.
J. Mammal. 20:440-455.

Outlines geography, distribution, habits, etc. for bighorn sheep in Texas.

Reasons for the small population were given as overhunting, eagle predation, competition and the initial small number.
Subject: RA1 PD1 BE2 Area: B Source: UOAL

SH0067

Demarchi, D.A. 1973.
Mountain sheep management for British Columbia.
Prepared by the Bovid Management Committee. Victoria, British Columbia.

Lists distributions of four races of mountain sheep in British Columbia, their historical and present use, and population problems. In light of this, a management policy is established which protects the sheep and their habitat, educates the public, and determines public need and user demand.
Subject: MA1 PD1 PD5 Area: A Source: AFWE

SH0401

Downing, S.C. 1950.
The Rocky Mountain bighorn.
Can. Nature 12(4):140-141.

Discussed habits, worldwide distribution, and physical characteristics of Rocky Mountain bighorn sheep in Canada and the U.S.
Subject: PD1 BE1 Area: A Source: ANNB

SH0100

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in the Rocky Mountain House area of the Eastern Slopes region.
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

The main objectives of this survey were to obtain a count and classification of all observable sheep within each delineated winter range complex. This data was then used to : (1) supplement trend data (density, distribution and composition), (2) predict harvestable rams, (3) allot non-trophy sheep permits, and (4) manage the species.
Subject: PD1 BE1 BE2 MA1 Area: B Source: AFWE

SH0099

Froggatt, K. 1980.
Aerial bighorn sheep survey of known winter ranges in Region 3 (Dec. to Jan., 1979-80).
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents results of an aerial sheep survey of fourteen known wintering areas of bighorn sheep in the Red Deer region, Alberta. Survey counts and classifies all observed sheep and then estimates population and harvestable rams based on herd size, composition and distribution of the classified sheep. This information can be used to develop management techniques in the area.
Subject: BE1 BE2 PD1 MA1 Area: B Source: AFWE

SH0117

Green, H.U. 1949.
The bighorn sheep of Banff National Park.
Dept. Services Branch, National Parks and Historic Sites Service. Ottawa, Canada.

A general description of bighorn sheep at Banff National Park. Topics include range description, diseases and parasites, population, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: B Source: CWSE

SH0123

Harrison, G., R. Hooper and P. Jacobson. 1982.
Ungulate population statistics and habitat analysis.
Natural History Research Div., Western Region, Parks Canada.

An investigation into the effect the Trans-Canada Highway has on ungulate mortality. The area of the highway studied is from the Banff National Park East gate to the Sunshine turn-off. In addition, the article briefly studies habitat and population distributions of elk, mule deer, white-tailed deer and bighorn sheep.
Subject: MF2 RA1 PD1 Area: B Source: KPWL

SH0132

Hickey, W.O. 1973.
Bighorn sheep ecology, job progress report.
Idaho Fish and Game Dept. Salmon, Idaho.

A report on vegetation, habitat, seasonal movements and distributions, and population dynamics of bighorn sheep in Idaho.
Subject: BE2 BE3 NP2 PD1 Area: B Source: CWSE

SH0134

Hoffman, W.H. 1971.
The limiting factors controlling the Ram Mountain bighorn sheep herd.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Presents details of the limiting factors regulating bighorn sheep numbers which directly and indirectly affect the differential survival of the various age groups within the population. Outlines the ecology and climate of the range, sheep population, natality and seasonal distributions, and gives detailed techiques.
Subject: RA1 PD1 BE2 Area: B Source: AFWE

SH0152

Hudson, R.J. and J.G. Stelfox. 1976.
Populations and diseases of bighorn sheep of the Canadian Rockies : a systems dynamics approach.
Can. Wildl. Serv. Edmonton, Alberta.

Data was based on longterm studies of range ecology, parasitism and population dynamics. Areas of study included Jasper, Banff and Waterton National Parks. The paper analyzed a system dynamics approach to the problem of sheep die-offs in the Canadian Rockies.
Subject: PD1 PD2 DP2 RA1 Area: A Source: CWSE

SH0162

Jorgenson, J.T. and W. Wishart. 1981.
Ram Mountain bighorn sheep study.
Progress Report 1981, Fish and Wildl. Div. Edmonton, Alberta.

Determines limiting factors tending to stabilize the Rocky Mountain bighorn sheep population at Ram Mountain, Alberta. Discusses population size, sex ratios, overwinter and lamb survival, productivity, and the effects of non-trophy hunting practises, in terms of possible management procedures.
Subject: PD1 PD3 PD4 MA1 Area: B Source: AFWE

SH0419

Kindel, F. et al. 1970.
Idaho game populations census and range study.
F.A. Idaho Project No. W-85-R. Boise, Idaho.

Gives detailed account of populations, mortality due to hunting, diseases and parasites, range condition, migration, and other causes of mortality of bighorn sheep in Idaho.
Subject: PD1 BE2 RA5 MF1 Area: B Source: ANNB

SH0406

McCann, L.J. 1956.
Ecology of the mountain sheep.
Amer. Midland Nat. 56:297-324.

Discussed: classification and distribution, physical characteristics, evolutionary implications, origin and recent history in North America, the Gros Ventre sheep range, behavior observations, herd organization and movements , food habits, natural enemies, accidents, parasites and disease, competition.
Subject: BE2 NP2 PD1 PD5 Area: B Source: ANNB

SH0420

Monson, G.C. 1961.
The importance of population data.
Trans. Desert Bighorn Counc. 5:108-109.

Discusses why population data is so important when studying sheep. Some topics discussed are movements, declines in numbers and population fluctuations with climate.
Subject: PD1 MA3 Area: B Source: ANNB UOAL

SH0207

Ogren, H.A. 1954.
A population study of the Rocky Mountain bighorn sheep (Ovis canadensis canadensis Shaw) on Wildhorse Island.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

Documents population changes and distributions over four years of study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The success and failure of various techniques of marking are dicussed. Diseases and parasites affecting the animals are outlined as well, and related to mortality.
Subject: PD1 MF1 DP2 RT7 Area: B Source: ANNB

SH0211

Packard, F.M. 1946.
An ecological study of the bighorn sheep in Rocky Mountain National Park, Colorado.
J. Mammal. 27(1):3-28.

A general study of Rocky Mountain bighorn sheep in Colorado. Topics discussed include habitat, population distribution, ranges and mortality factors. Also included is a study of reasons for the population decline.
Subject: RA1 RA4 PD1 MF1 Area: B Source: CWSE

SH0214

Pengelly, L. 1970.
The biology and conservation of North American wild sheep.
Msc. Thesis, Univ. of Montana. Missoula, Montana.

Outlines management considerations in light of diseases, mortality factors, population dynamics and behavior, and range quality of six types of wild sheep in North America. The main study area is the United States.
Subject: MA1 DP1 MF1 PD1 Area: B Source: CWSE

SH0424

Schallenberger, A. 1970.
Population characteristics and harvest of bighorn sheep on the Sun River Area, Montana.
Trans. North.Wild Sheep Counc. p. 24 (Abst.).

Looks at the history and physiography, forage utilization, range condition , harvest through hunting, and trapping and transplanting of a herd of bighorn sheep in the Sun River Area, Montana. The results are then compared to those of bighorn sheep in Nevada.
Subject: PD1 PD5 BE2 Area: B Source: ANNB AFWE

SH0496

Schmidt, J.L. and eds. D.L. Gilbert 1980.
Big game of North America, ecology and management.
Stackpole Books. Harrisburg, Pennsylvania.

A good reference on the ecology and management of the big game of North America. Includes short articles on various animals, and concludes with a series of reports dealing specifically with habitat, and management problems.
Subject: BE1 PD1 RA1 MA1 Area: B Source: AFWL

SH0413

Service., Fish and Wildlife 1940.
Big game inventory of the United States.
USDI Fish and Wildl. Serv. Wildl. Leaflet BS-175.

The Rocky Mountain bighorn included Ovis canadensis canadensis and Ovis canadensis sierrae. An accounting was given of the numbers of these animals on biological survey land, national forests, national parks and monuments, Indian reservations, grazing districts, and State and private lands.
Subject: PD1 BE2 Area: B Source: ANNB

SH0246

Shackleton, D. 1969.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Research proposal for the Univ. of Calgary. Calgary, Alberta.

Outlines techniques and hypotheses upon which the investigation on the population of bighorn sheep will be based. Areas of study include Banff and Waterton National Parks.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0247

Shackleton, D.M. 1970.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Progress Report for The Univ. of Calgary. Calgary, Alberta.

Looks at population quality and some behavioral aspects of Rocky Mountain bighorn sheep in Banff and Waterton National Parks, as well as two areas in Montana. Skeletal analysis is one of the main techniqus used and discussed.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0425.

Shantz, H.L. 1939.
The bighorn and national forests.
Conservation 5(1):34-37.

Discusses predation, poaching and domestic sheep as contributing to the declining numbers of bighorn sheep in the national forests of the United States.
Subject: MF3 MF4 PD1 Area: B Source: ANNB

SH0428

Smith, D.R. 1953.
Idaho bighorn sheep studied.
Idaho Wildl. Rev. 5(5):4-7, 10.

Gives physical attributes, location, early history, losses, herd productivity, and management considerations of bighorn sheep in Idaho.
Subject: PD1 PD5 MA3 Area: B Source: ANNB

SH0359

Smith, D.R. 1954.
Life history and ecology of the bighorn sheep in Idaho.
Unpub. MSc. Thesis, Univ. of Idaho. Moscow, Idaho.

Range, physical characteristics, vegetation, life history, and some management considerations for bighorn sheep in Idaho were discussed.
Subject: PD1 PD5 RA1 RA6 Area: B Source: ANNB

SH0260

Smith, D.R. 1954.
The bighorn sheep in Idaho, its status, life history and management.
Dept. of Fish and Game, State of Idaho. Boise, Idaho.

A general study on bighorn sheep in Idaho with an analysis of why the population numbers are declining, and what can be done to alter the situation. Habitat, behavior diseases and management are discussed.
Subject: PD1 MA2 MA3 Area: B Source: CWSE

SH0261

Smith, I. and R. Demarchi. 1969.
Mountain sheep in British Columbia.
B.C. Fish and Wildl. Branch. Victoria, British Columbia.

A general description of mountain sheep in the Rocky Mountains of British Columbia. Topics include habitat, population distributions, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: A Source: KPWL

SH0269

Stelfox, J.G. 1964.
Bighorn ecological study in the Coalbranch Region (Drummond Creek south to Ruby Creek).
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents range conditions, distribution and population of bighorn sheep and elk herds in the Drummond-Ruby Creek region of the Coalbranch, in order that some effective management proposals could be outlined.
Subject: PD1 BE1 BE2 MA1 Area: B Source: CWSE

SH0276

Stelfox, J.G. 1967.
Transactions of first northern wild sheep field study, May 1-9, 1967.
Can. Wildl. Serv. Report to Parks Canada.

Outlines the daily proceedings of the study. Documents various techniques used, as well as the general conditions of the herds. The study was conducted in Kootenay, Banff and Jasper National Parks.
Subject: PD1 BW RT5 RT6 Area: A Source: KPWL

SH0308

Streeter, R.G. 1970.
A literature review on bighorn sheep population dynamics.
Special Report #24, Colorado Div. Game, Fish and Parks. Colorado.

Literature concerning the population dynamics of bighorn sheep (Ovis canadensis) is reviewed, synthesized and discussed under categories of population demography, breeding biology, nutrition, diseases and parasites, competition, predation and hunting.
Subject: BW PD1 DP1 MF1 Area: C Source: AFWE

SH0498

Watt, R. 1983.
Wildlife survey, Waterton Lakes National Park.
Waterton Lakes Nat. Park Warden Serv.

Documents the results of aerial and ground surveys of wildlife in Waterton Lakes National Park, Feb. 3, 1983. Details of methods used and costs

incurred are included.
Subject: RT6 BE2 PD1 Area: B Source: AFWL

SH0499

Watt, R. 1983.
Wildlife survey - March 26, 1983, Waterton Lakes National Park.
Waterton Lakes Nat. Park Warden Serv.

Documents results of aerial and ground surveys of wildlife in Waterton Lakes National Park, March 26, 1983. Details of methods used and costs of the operations are included.
Subject: RT6 BE2 PD1 Area: B Source: AWFL

SH0343

Wishart, W.D. 1980.
Bighorn sheep. In Big game of North America, ecology and management. pp 161-171. J.L. Schmidt and D.L. Gilbert, eds.
Stackpole Books. Harrisburg, Pennsylvania.

Discusses the general physical description, population dynamics, food habits, diseases and parasites, competition, predation and various management consideraions (harvesting, populations and habitat) of the four species of bighorn sheep inhabiting North America.
Subject: PD1 DP1 BE1 MF1 Area: B Source: AFWE

SH0336

Wishart, W.D. 1966.
Bighorn population and harvest study.
Wildl. Investigations Report, Alta. Fish and Wildl. Edmonton, Alberta.

Documents the sex and age structure, population numbers of bighorn sheep, and the location of 19 winter ranges in Alberta. This information is then related to the present harvest methods.
Subject: PD1 BE1 BE2 MA4 Area: B Source: AFWE

SH0350

Woodgerd, W. 1964.
Population dynamics of bighorn sheep of Wildhorse Island.
J. Wildl. Manage. 28(2):381-391.

Detailed study of the population dynamics of a herd of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The study period was three years, and the population information ranges over 22 years.
Subject: PD1 PD2 PD3 PD4 Area: B Source: CWSE

DIE-OFFS AND RECOVERIES (PD2)

SH0010

Anonymous. 1983.
Bighorn sheep die-off workshop proceedings.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A thorough investigation into the re-occurring disease outbreaks of Rocky Mountain bighorn sheep in southeastern British Columbia and southwestern Alberta. Various factors affecting bighorn populations are discussed, as well as general management techniques.
Subject: BW PD2 DP1 Area: A Source: CWSE BFWC

SH0012

Bandy, P.J. 1966.
Bighorn sheep die-off in British Columbia : a complex of environmental factors. Ottawa, Canada.
The 1966 Annual Meeting of the Can. Soc. of Wildl. and Fishery Biologists January 4, 1966.

This paper discusses the relation of environmental factors to bighorn sheep population dynamics (particularly die-offs) in British Columbia.
Subject: DP2 PD2 Area: A Source: CWSE

SH0398

Buechner, H.K. 1956.
The future of the bighorn sheep.
Animal Kingdom 59(1):2-10.

The author censused bighorns by aerial counts. Herds in various states were described and a graph was pesented of the present status of the sheep in the United States. Discusses reasons and results of die-offs, and considers harvesting as a means of population control.
Subject: PD2 PD1 Area: B Source: ANNB

SH0064

Demarchi, D.A 1972.
Post die-off recovery of East Kootenay bighorn sheep.
North. Wild Sheep Counc. Proc., Hinton, Alberta. 1972:22-26.

Presents a review of the total changes in numbers as a result of die-offs of various herds of bighorn sheep in the East Kootenay district of southeastern B.C.. Includes a comparison of post die-off response in two herds.
Subject: PD2 PD5 Area: A Source: KPNL

SH0479

Demarchi, R.A. and D.A. Demarchi. 1967.
Status of the Rocky Mountain bighorn.
Wildl. Rev. 4(4):10-14.
Subject: PD2 PD3 BE1 Area: B Source: UOAL

SH0083

Festa-Bianchet, M. 1983.
Report on a bighorn sheep - lungworm study at Sheep River, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

A detailed study of Rocky Mountain bighorn sheep at Sheep River, Alberta.

Documents population dynamics, behavior and lungworm infection of this band.
Subject: PD2 DP2 RT6 BE2 Area: B Source: CWSE

SH0091

Forrester, D.J. and C.M. Senger. 1963.
Bighorns and lungworm.
Montana Wildl. April, 1963:2-7.

Examines the sheep population die-offs in the 1900's, and investigates the role of the lungworm in the declining numbers.
Subject: DP2 PD2 Area: B Source: CWSE

SH0093

Forrester, D.J. and C.M. Senger. 1964.
Prenatal infection of bighorn sheep with protostrongylid lungworms.
Nature 201(4923):1051.

Determines whether prenatal infection of bighorn sheep (Ovis c. canadensis) with protostrongylid lungworms is a form of population control. The study was conducted in Montana.
Subject: DP2 PD2 Area: B Source: CWSE

SH0116

Goodson, N.J. 1982.
Effects of domestic sheep grazing on bighorn sheep populations : a review.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:287-313.

Reviews the effects of domestic sheep grazing on the ranges of Rocky Mountain bighorn sheep populations in the Big-Belt Mountains of westcentral Montana. The paper is divided into three categories : competition for forage, space, and transmission of diseases. Included are recent reports of die-offs and transplants of sheep in various areas of North America.
Subject: RA4 DP1 PD2 Area: A Source: AFWE

SH0137

Holmes, J.C. and W.M. Samuel. 1974.
Surveillance study of the parasites of bighorn sheep in the mountain national parks.
Dept. of Zoology, The Univ. of Alberta. Edmonton, Alberta.

Studies the relation between infection of parasites in bighorn sheep and the history of population die-offs. Documents sampling and evaluation of health of individual herds from Jasper, Kootenay and Waterton National Parks. Some techniques are discussed.
Subject: DP2 RT5 PD2 Area: A Source: KPWL KPNL

SH0139

Horejsi, B. 1972.
Behavioral differences in bighorn lambs (Ovis canadensis canadensis Shaw) during years of high and low survival.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972:51-73.

Relates behavioral differences in Rocky Mountain bighorn lambs to the

expansion (or declination) of the population. The study area was the Sheep River area of southwest Alberta.
Subject: BE1 BE2 PD2 PD4 Area: B Source: KPNL

SH0152

Hudson, R.J. and J.G. Stelfox. 1976.
Populations and diseases of bighorn sheep of the Canadian Rockies : a systems dynamics approach.
Can. Wildl. Serv. Edmonton, Alberta.

Data was based on longterm studies of range ecology, parasitism and population dynamics. Areas of study included Jasper, Banff and Waterton National Parks. The paper analyzed a system dynamics approach to the problem of sheep die-offs in the Canadian Rockies.
Subject: PD1 PD2 DP2 RA1 Area: A Source: CWSE

SH0193

Moser, C.A. 1962.
The bighorn sheep of Colorado.
Technical Publication #10, Colorado Game and Fish Dept.

The paper is a good overview of the life of Colorado mountain sheep. Three main groups are studied : Dall, Stone and Rocky Mountain bighorn sheep. It gives clinical diagnoses for sheep which were found dead, and studies causes of die-offs in 1885, 1900 and 1923-24. Some methods of research are described.
Subject: DP1 MF1 MA1 PD2 Area: B Source: CWSE

SH0210

Packard, F.M. 1939.
Progess report on the decline and present status of the bighorn sheep in Rocky Mountain National Park, Oct. 5, 1939.
File 715-06, Library, Rocky Mountain National Park. Colorado

This report discusses the history, physiological factors, remedies, and present population (1939) studies of bighorn sheep in Rocky Mountain National Park. Documents incidence of lungworm which contributes to the declining population.
Subject: PD2 PD5 Area: B Source: ANNB

SH0364

Potts, M.K. 1938.
Status of the bighorn sheep in Rocky Mountain National Park.
On file, Office of Chief Park Ranger, Rocky Mountain National Park. Colorado.

This report gave a brief history of bighorn sheep in the park and talked about their decline. Discussed range conditions as the main problem causing the declining numbers of sheep in Rocky Mountain National Park.
Subject: PD2 PD5 Area: B Source: ANNB

SH0453

Rush, W.M. 1935.
The Rocky Mountain bighorn.
The Colorado Forester, Wildl. Ed. Fort Collins, Colorado. 1935:21-24.

Investigates the low numbers and declining populations of bighorn sheep in Colorado. Management suggestions were made to stop the declination.
Subject: PD2 MA3 MA4 Area: B Source: ANNB

SH0241

Schwantje, H. 1984.
A comparitive study of physiologic and pathologic features of Rocky Mountain bighorn sheep herds in the East Kootenays with differing histories of disease occurrence.
B.C. Fish and Wildl. Branch, Progress Report. Cranbrook, British Columbia.

The study outlines the health conditions, status, die-off and recovery of various herds, as well as the diseases and parasites affecting the sheep in the East Kootenays of British Columbia.
Subject: PD2 PD3 DP2 Area: A Source: CWSE

SH0284

Stelfox, J.G 1971.
Bighorn sheep in the Canadian Rockies : a history 1800-1970.
Can. Field Nat. 85(2):101-122.

Documents the history of bighorn sheep populations, their number and distribution, from 1800 to 1970 on the east slopes of the Rocky Mountains, and the west slopes in Kootenay National Park.
Subject: BE2 PD2 PD5 Area: A Source: KPWL CWSE

SH0279

Stelfox, J.G. 1968.
Population dynamics and range ecology of bighorn sheep in Rocky Mountain national parks. Phase 1 : population fluctuations of bighorn sheep in the Canadian Rocky Mountains from 1800 to 1967.
Can. Wildl. Serv. Edmonton, Alberta.

The report gives a detailed history of population dynamics of bighorn sheep of the East slopes of the Rocky Mountains in Alberta. Environmental factors were analyzed in order to determine their role in the population fluctuations.
Subject: PD2 RA1 MF1 BE2 Area: A Source: CWSE

SH0278

Stelfox, J.G. 1967.
Transactions of the first northern wild sheep conference, May 1-9, 1967.
Can. Wildl.Serv. Edmonton, Alberta.

Outlines the proceedings of the wild sheep conference. Topics discussed are population fluctuations, and techniques used in research. The study area is the Rocky Mountains of Alberta and British Columbia. Included are extensive literature reviews - on mountain sheep in general, as well as one on the techniques of field immobilization of animals.
Subject: BW PD2 DP2 RT5 Area: A Source: CWSE

SH0275

Stelfox, J.G. 1967.
Bighorn sheep abundance and distribution in Banff, Jasper, Waterton Lakes and Kootenay National Parks, 1966-1967.
Can. Wildl. Serv. Edmonton, Alberta.

Presents data on populations and distributions (especially seasonal abundance and herd distributions). The populations are correlated to range conditions and trends, and these are investigated as to their responsibility for population declines.
Subject: PD2 BE2 RA2 Area: A Source: CWSE

SH0282

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Canadian Rocky Mountain national parks, 1966-1971.
Can. Wildl. Serv. Edmonton, Alberta.

Documents die-offs, seasonal distributions, range conditions and diseases and parasites of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Relates these factors to animal conditions, reproduction and mortality.
Subject: PD2 RA1 DP1 MF1 Area: A Source: CWSE

SH0309

Streeter, R.G. 1971.
Lungworm infection and mortality in bighorn sheep populations.
Presented at 51'st Amer. Soc. Mammal. Conf. Vancouver, British Columbia.

Examines population die-offs of Rocky Mountain bighorn sheep in two areas in the front range of the Colorado Rockies. Relates lungworm infection to the population declines.
Subject: DP2 PD2 Area: B Source: CWSE

SH0307

Streeter, R.G. 1969.
Demography of two Rocky Mountain bighorn sheep populations in Colorado.
Unpub. PhD. Thesis, Colorado State Univ. Fort Collins, Colorado.

Studies the change in range ecology, population growth and mortality over a four year study period of 2 Rocky Mountain bighorn sheep populations at Buffalo Peaks, Colorado. Discusses hunting and nutritional deficiencies affecting population declines and range usage.
Subject: RA1 PD2 PD4 MA4 Area: B Source: ANNB

SH0497

Sturko, A.N. 1969.
Rocky Mountain bighorn sheep, Waterton Lakes National Park.
Report by Chief Park Warden, Waterton Lakes Nat. Park.

Documents physical characteristics (age, weight, length of horns, chest girth and general health condition) and migration patterns of Rocky Mountain bighorn sheep in Waterton Lakes National Park.
Subject: PD2 BE2 PD4 Area: B Source: WNPL

SH0325

Tighem, K. Van 1981.
Mortality of bighorn sheep (Ovis canadensis) on a railroad and highway in Jasper National Park, Canada.
Can. Wildl. Serv. Edmonton, Alberta.

Documents sheep mortality primarily on the C.N.R. and Yellowhead Highway in Jasper National Park. Some solutions in the way of management are given.
Subject: MF2 PD2 MA1 Area: B Source: CWSE

SH0345

Wishart, W.D., J. Jorgenson and M. Hilton. 1980.
A minor die-off of bighorns from pneumonia in southern Alberta (1978).
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:229-247.

Describes the events before and after a minor all age die-off of Rocky Mountain bighorn sheep at the Sheep River Sanctuary, Alberta. Pneumonia is discussed as the cause, and the case histories and results are included.
Subject: PD2 DP2 Area: B Source: AFWE

SH0350

Woodgerd, W. 1964.
Population dynamics of bighorn sheep of Wildhorse Island.
J. Wildl. Manage. 28(2):381-391.

Detailed study of the population dynamics of a herd of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The study period was three years, and the population information ranges over 22 years.
Subject: PD1 PD2 PD3 PD4 Area: B Source: CWSE

HEALTH AND CONDITION (PD3)

SH0013

Banfield, A.W.F. 1974.
The mammals of Canada. (pp. 413-416).
The Univ. of Toronto Press. Toronto, Canada.

Gives status and distribution of bighorn sheep in North America and Canada as well as a discussion of morphology, habits, habitat, reproduction, and taxonomy plus references.
Subject: RA1 BE1 PD3 Area: C Source: KPNL CWSE UOAL

SH0400

Contor, R.J. 1958.
A survey of the bighorn sheep in Rocky Mountain National Park, Colorado.
On file, Office of the Park Ranger, Rocky Mountain National Park, Colorado.

This report follows Packard's efforts of 1939 and is a survey of bighorns in

Rocky Mountain National Park. Overcrowding of wintering area was evident. Limiting factors such as food conditions, mineral deficiency, diseases and parasites, lungworms, coccidiosis, and Hemorraghic septicemia were mentioned. Early death of lambs due to predation by coyotes and cougar was noted.
Subject: MF1 MF3 MF4 PD3 Area: B Source: ANNB

SH0479

Demarchi, R.A. and D.A. Demarchi. 1967.
Status of the Rocky Mountain bighorn.
Wildl. Rev. 4(4):10-14.
Subject: PD2 PD3 BE1 Area: B Source: UOAL

SH0405

Game., Idaho Dept. of Fish and 1950.
Bighorn sheep receive study to determine management requirements.
Idaho Wildl. Review Aug.-Sept., 1950:3,9.

A history of bighorn sheep numbers and a description of the animal were given.
Subject: PD3 PD5 Area: B Source: ANNB

SH0128

Hebert, D.M. 1976.
Intensive sheep production product, Okanagan Game Farm (preliminary outline).
B.C. Fish and Wildl. Branch. Nanaimo, British Columbia.

Contains various papers dealing with bighorn sheep production on the Okanagan Game Farm, British Columbia. Outlines the research program to be conducted on the farm, and includes various techniques and theoretical considerations.
Subject: PD3 MA1 BE1 RT4 Area: B Source: CWSE

SH0124

Hebert, D.M. 1972.
Difference between years .and nutrient cycles.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972: 15-20.

Relates growth of Rocky Mountain bighorn sheep to nutrition in diet and the climate of their ranges.
Subject: RA6 PD3 PD4 NP1 Area: A Source: KPNL

SH0146

Hudson, R.J. 1973.
Stress and in vitro lymphocyte stimulation by Phytohemagglutin in Rocky Mountain bighorn sheep.
Can. J. Zool. 51(5) : 479-482.

Relates various types of stress to the pneumonic diseases of the Rocky Mountain bighorn sheep. Tested changes in in vitro lymphocyte response as a measure of stress. The study area was Jasper National Park, Alberta.
Subject: DP2 PD3 Area: A Source: UOAL

SH0145

Hudson, R.J. 1972.
Stress-induced immunologic impairment in Rocky Mountain bighorn sheep.
North. Wild Sheep Counc., Hinton, Alberta. April 11-13, 1972:31-34.

The paper discusses how stress can cause immunological impairment in Rocky Mountain bighorn sheep. The sheep were studied in Jasper National Park.
Subject: DP1 PD3 Area: B

SH0274

J.G., Stelfox. 1966.
Detailed data on diseased bighorns immobilized, treated and necropsied from the Radium Hot Springs and Jasper herds, Sept. 25 - Nov. 15, 1966.
Can. Wildl. Serv. Edmonton, Alberta.

Documents treatments of diseased bighorn sheep from the Radium Hot Springs and Jasper herds. Condition and health of the animals is described.
Subject: DP1 DP2 PD3 RT5 Area: A Source: CWSE

SH0162

Jorgenson, J.T. and W. Wishart. 1981.
Ram Mountain bighorn sheep study.
Progress Report 1981, Fish and Wildl. Div. Edmonton, Alberta.

Determines limiting factors tending to stabilize the Rocky Mountain bighorn sheep population at Ram Mountain, Alberta. Discusses population size, sex ratios, overwinter and lamb survival, productivity, and the effects of non-trophy hunting practises, in terms of possible management procedures.
Subject: PD1 PD3 PD4 MA1 Area: B Source: AFWE

SH0230

Riney, T. 1960.
A field technique for assessing physical condition of some ungulates.
J. Wildl. Manage. 24(1):92-94.

Describes a method of assessing physical condition of deer in Southern Rhodesia. This technique can be applied to other ungulates as well.
Subject: PD3 RT9 Area: C Source: CWSE

SH0241

Schwantje, H. 1984.
A comparitive study of physiologic and pathologic features of Rocky Mountain bighorn sheep herds in the East Kootenays with differing histories of disease occurrence.
B.C. Fish and Wildl. Branch, Progress Report. Cranbrook, British Columbia.

The study outlines the health conditions, status, die-off and recovery of various herds, as well as the diseases and parasites affecting the sheep in the East Kootenays of British Columbia.
Subject: PD2 PD3 DP2 Area: A Source: CWSE

SH0246

Shackleton, D. 1969.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Research proposal for the Univ. of Calgary. Calgary, Alberta.

Outlines techniques and hypotheses upon which the investigation on the population of bighorn sheep will be based. Areas of study include Banff and Waterton National Parks.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0247

Shackleton, D.M. 1970.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Progress Report for The Univ. of Calgary. Calgary, Alberta.

Looks at population quality and some behavioral aspects of Rocky Mountain bighorn sheep in Banff and Waterton National Parks, as well as two areas in Montana. Skeletal analysis is one of the main techniqus used and discussed.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0263

Smith, K. and W. Wishart. 1977.
Ram Mountain bighorn sheep study progress report - 1976.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Discusses the effects of orphaning bighorn lambs on Ram Mountain, Alberta. Positive and negative aspects of the non-trophy season, distributions and movements of the sheep, and factors influencing this are also discussed.
Subject: PD3 PD4 BE2 MF4 Area: B Source: AFWE

SH0306

Stewart, S.T. and T.W. Butts. 1982.
Horn growth as an index to levels of inbreeding in bighorn sheep.
Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:68-82.

Examines the relative importance of genetics and nutrition to horn growth in 17 bighorn sheep populations in Montana. Management considerations are discussed with respect to the results of the study.
Subject: PD4 PD3 Area: B Source: AFWE

SH0341

Wishart, W.D. 1976.
The Ram Mountain orphan lamb experiment.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:70-80.

Preliminary report of the orphan lamb experiment on Ram Mountain in Alberta. Studies the survival of selectively orphaned lambs as compared to non-orphans. The growth patterns are documented, and implications of orphaning with respect to hunting regulations and management considerations is included.
Subject: MA1 PD3 PD4 Area: B Source: AFWE

SH0349

Woodard, T.N., R.J. Gutierrez and W.H. Rutherford. 1974.
Bighorn lamb production, survival, and mortality in southcentral Colorado.
J. Wildl. Manage. 38(4):771-774.

Study determined sheep distribution, lamb birth rate, survival and mortality of Rocky Mountain bighorn sheep herds in southcentral Colorado.
Subject: MF1 MF2 PD3 PD4 Area: B Source: UOAL CWSE

SH0350

Woodgerd, W. 1964.
Population dynamics of bighorn sheep of Wildhorse Island.
J. Wildl. Manage. 28(2):381-391.

Detailed study of the population dynamics of a herd of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The study period was three years, and the population information ranges over 22 years.
Subject: PD1 PD2 PD3 PD4 Area: B Source: CWSE

REPRODUCTION AND GROWTH (PD4)

SH0011

Armstrong, G.G. 1965.
An examination of the cementum of the teeth of Bovidae with special reference to its use in age determination.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Studies annuli in tooth cementum of bison, bighorn sheep (Ovis c. canadensis) and some Rocky Mountain goats and domestic cattle, in relationship to age judged by annual horn growth. The causes of seasonal changes in cementum and the research techniques involved are outlined in detail. Sheep were taken from the eastern slopes of the Rocky Mountains in Alberta.
Subject: RT6 PD4 Area: B Source: UADZ

SH0026

Blood, D.A. 1966.
Progress report on bighorn sheep investigations in the Rocky Mountain national parks.
Canadian Wildlife Service. Edmonton, Alberta.

A study investigating population dynamics and herd composition in Waterton and Jasper national parks. Included is data pertaining to contagious ecthyma in bighorn sheep in Banff, Jasper, Waterton, Kootenay and Glacier national parks.
Subject: PD1 PD4 RT6 DP1 Area: A Source: CWSE

SH0028

Blood, D.A., W.D. Wishart and D.R. Flook. 1970.
Weights and growth of Rocky Mountain bighorn sheep in western Alberta.
J. Wildl. Manage. 34(2):451-455.

A report documenting the weights and growth of three bighorn sheep herds in Alberta (Waterton National Park, Sheep Creek, Alberta and Jasper National Park).
Subject: PD4 Area: B Source: CWSE BFWN

SHO505

Bunnell, F.L. 1982.
The lambing period of mountain sheep: synthesis, hypothesis and tests.
Can. J. Zool. 60: 1-14.

Reviews lambing periods of 30 populations of North American mountain sheep. For all populations lambing begins later and is of shorter duration at more northern latitudes. Onset and duration of lambing are more highly correlated with the phenological index than wtih latitude alone, particularly amoung alpine populations.
Subject: PD4 PD5 Area: B Source: CWSE UOAL

SH0415

Couey, F.M. 1966.
Rocky Mountain bighorn of Montana.
Montana Fish and Game Comm. Bull. 2.

Topics include: the early history of bighorns and their extent in North America, history and present distribution in Montana, the Sun River bighorn herd - its location and history, distribution and numbers, age classes and sex ratios, E:L ratios, life habits, forage utilization, range use, parasites and disease, predator relationships, recreational use in the area of the herd, and trapping and transplanting of these bighorn.
Subject: PD5 PD4 NP2 RA3 Area: B Source: ANNB

SH0053

Cowan, I.McT. 1950.
Some vital statistics of big game on overstocked mountain range.
Trans. of the Fifteenth North Amer. Wildl. Conf., San Francisco, California. March 6,7,9, 1950:581-588.

Outlines the sex ratios, fertility and effective reproduction of big game animals on overstocked mountain ranges in Jasper, Banff, Kootenay and Yoho national parks. Includes a description of range vegetation and utilization.
Subject: PD1 PD4 RA3 BE3 Area: A Source: UOAL

SH0088

Forrester, D.J. and R.S. Hoffmann. 1963.
Growth and behavior of a captive bighorn lamb.
J. Mammal. 44(1):116-118.

Describes how a captive Rocky Mountain bighorn lamb grew, behaved and it's general condition. Article looks at infections and disease as well.
Subject: PD4 Area: B Source: CWSE

SH0395

Forrester, D.J. and C.M. Senger. 1965.
Fetal measurements and milk characteristics of bighorn sheep.
J. Mammal. 46(3):524-545.

Investigates the pH, specific gravity, percent of total solids, and percent of ash in the milk of bighorn sheep and compares these values to other species. Also gives measurements for lambs and fetuses.
Subject: PD4 Area: B Source: ANNB UOAL

SH0108

Geist, V. 1968.
On delayed social and physical maturation in mountain sheep.
Can. J. Zool. 46:899-904.

Gives detailed descriptions of parameters of maturation for native North American sheep. These parameters include social as well as physical characteristics. Also discusses delayed maturation in light of these characteristics.
Subject: PD4 BE1 Area: C Source: UOAL

SH0103

Geist, V. 1966.
Validity of horn segment counts in aging bighorn sheep.
J. Wildl. Manage. 30(3):634-635.

Discusses the use of horn segment counts as a determinant of age in bighorn sheep in Banff National Park.
Subject: PD4 RT6 Area: B Source: CWSE

SH0107

Geist, V. 1968.
On the interactions of external appearance, social behavior and social structure of mountain sheep.
The Univ. of B.C. Vancouver, British Columbia.

Investigates animal behavior in relation to physiology and anatomy. Various species of mountain sheep are described and there are various locations of study (including Rocky Mountain bighorn sheep in Banff National Park).
Subject: BE1 PD4 Area: B Source: CWSE

SH0115

Geist, V. and R.G. Petocz. 1977.
Bighorn sheep in winter : Do rams maximize reproductive fitness by spatial and habitat segregation from ewes?
Can. J. Zool. 55(11):1802-1810.

Discusses the seasonal distributions of rams and ewes (Rocky Mountain bighorn sheep) on the Palliser Range of Banff National Park. Investigates the seperation of ewes and rams during the winter with respect to vegetation, climate and competition between male and female. The geography of the range is also taken into consideration.
Subject: BE2 BE3 BE5 PD4 Area: B Source: CWSE

SH0124

Hebert, D.M. 1972.
Difference between years and nutrient cycles.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972: 15-20.

Relates growth of Rocky Mountain bighorn sheep to nutrition in diet and the climate of their ranges.
Subject: RA6 PD3 PD4 NP1 Area: A Source: KPNL

SH0139

Horejsi, B. 1972.
Behavioral differences in bighorn lambs (Ovis canadensis canadensis Shaw) during years of high and low survival.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972:51-73.

Relates behavioral differences in Rocky Mountain bighorn lambs to the expansion (or declination) of the population. The study area was the Sheep River area of southwest Alberta.
Subject: BE1 BE2 PD2 PD4 Area: B Source: KPNL

SH0162

Jorgenson, J.T. and W. Wishart. 1981.
Ram Mountain bighorn sheep study.
Progress Report 1981, Fish and Wildl. Div. Edmonton, Alberta.

Determines limiting factors tending to stabilize the Rocky Mountain bighorn sheep population at Ram Mountain, Alberta. Discusses population size, sex ratios, overwinter and lamb survival, productivity, and the effects of non-trophy hunting practises, in terms of possible management procedures.
Subject: PD1 PD3 PD4 MA1 Area: B Source: AFWE

SH0225

Ramsey, M.A. and R.M. Sadleir. 1979.
Detection of pregnancy in living bighorn sheep by progestin determination.
J. Wildl. Manage. 43(4):970-973.

Documents the method of detecting pregnancy, by means of blood sampling, in bighorn sheep in British Columbia.
Subject: PD4 RT6 Area: B Source: CWSE UOAL

SH0248

Shackleton, D.M. 1976.
Variability in physical and social maturation between bighorn sheep (Ovis canadensis canadensis Shaw) populations.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:1-8.

Examines potential implications of observed variability in physical and social maturation between bighorn sheep populations in Banff and Kootenay National Parks. Relates this difference to some of the problems which may be faced in the management of mountain sheep.
Subject: MA3 PD4 Area: A Source: AFWE

SH0249

Shackleton, D.M. and D.A. Hutton. 1971.
An analysis of the mechanisms of brooming of mountain sheep horns.
Univ. of Calgary. Calgary, Alberta.

Discusses the behavioral causes of broomed horns in bighorn sheep.
Subject: PD4 BE1 Area: C Source: CWSE KPNL

SH0263

Smith, K. and W. Wishart. 1977.
Ram Mountain bighorn sheep study progress report - 1976.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Discusses the effects of orphaning bighorn lambs on Ram Mountain, Alberta. Positive and negative aspects of the non-trophy season, distributions and movements of the sheep, and factors influencing this are also discussed.
Subject: PD3 PD4 BE2 MF4 Area: B Source: AFWE

SH0266

Spencer, C.C. 1943.
Notes on the life history of Rocky Mountain bighorn sheep in the Tarryall Mountains of Colorado.
J. Mammal. 24(1):1-11.

Gives general descriptions of species competition, lambing range, diseases, mortality due to predation and poaching, and reproduction of Rocky Mountain bighorn sheep in Colorado.
Subject: RA5 PD4 PD5 RA4 Area: B Source: CWSE

SH0272

Stelfox, J.G. 1966.
Bighorn and Rocky Mountain goat populations, reproductions, harvests and proposed 1966 seasons.
Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents population, reproduction and harvests of bighorn sheep and Rocky Mountain goats in the Coalbranch region, Alberta. Range condition, trend, and climates are discussed for this area. Some management considerations with respect to harvesting are also outlined.
Subject: PD4 RA2 MA1 MF4 Area: B Source: CWSE

SH0283

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Rocky Mountain national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Documents population fluctuations, abundance and distribution, diseases and parasitism, and the ecology of the winter ranges of bighorn sheep in Kootenay, Waterton, Banff and Jasper National Parks.
Subject: PD4 BE2 DP1 RA2 Area: A Source: CWSE

SH0297

Stelfox, J.G. and J. McGillis. 1970.
Seasonal growth patterns of bighorns correlated with range conditions and endoparasite loads.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970:35-38.

Paper outlines the direct correlation between forage production, ungulate stocking rates, endoparasite loads and overwinter weight losses. The data was obtained from Jasper, Banff, Waterton and Kootenay National Parks.
Subject: DP1 RT4 PD4 Area: A Source: CWSE

SH0299

Stelfox, J.G. and D.M. Poll. 1978.
Weights, measurements and tooth replacement of Rocky Mountain bighorn sheep in Canadian national parks, 1967-1971.
Can. Wildl. Serv. Report to Parks Canada. Edmonton, Alberta.

Documents body weights and measurements of bighorn sheep in Banff, Jasper, Kootenay and Waterton Lakes National Parks. Includes the technique of using horn size and markings to determine growth of the animals.
Subject: PD4 Area: B Source: CWSE KPNL KPWL

SH0306

Stewart, S.T. and T.W. Butts. 1982.
Horn growth as an index to levels of inbreeding in bighorn sheep.
Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:68-82.

Examines the relative importance of genetics and nutrition to horn growth in 17 bighorn sheep populations in Montana. Management considerations are discussed with respect to the results of the study.
Subject: PD4 PD3 Area: B Source: AFWE

SH0307

Streeter, R.G. 1969.
Demography of two Rocky Mountain bighorn sheep populations in Colorado.
Unpub. PhD. Thesis, Colorado State Univ. Fort Collins, Colorado.

Studies the change in range ecology, population growth and mortality over a four year study period of 2 Rocky Mountain bighorn sheep populations at Buffalo Peaks, Colorado. Discusses hunting and nutritional deficiencies affecting population declines and range usage.
Subject: RA1 PD2 PD4 MA4 Area: B Source: ANNB

SH0497

Sturko, A.N. 1969.
Rocky Mountain bighorn sheep, Waterton Lakes National Park.
Report by Chief Park Warden, Waterton Lakes Nat. Park.

Documents physical characteristics (age, weight, length of horns, chest girth and general health condition) and migration patterns of Rocky Mountain bighorn sheep in Waterton Lakes National Park.
Subject: PD2 BE2 PD4 Area: B Source: WNPL

SH0430

Taylor, R.A. Jr. 1962.
Characteristics of horn growth in bighorn sheep lambs.
Msc. Thesis, Montana State Univ. Bozeman, Montana.

Studies and compares skeletons and horns of 37 bighorn rams and ewes. Discusses the relationship of horn growth to environmental factors.
Subject: PD4 Area: B Source: ANNB

SH0504

Thompson, R.W. and J.C. Turner. 1982.
Temporal geographic variation in the lambing season of bighorn sheep.
Can. J. Zool. 60: 1781-1793.

Paper assesses the variation in lambing seasons of 22 populations of bighorn sheep from Canadian national parks to western Texas. Lambing in northern populations is cued to a brief, relatively predictable period of plant growth while southern bighorn protract lambing such that some recruitment coincides with relatively unpredicatable plant growth, triggered by erratic rains.
Subject: PD4 PD5 RA6 Area: B Source: CWSE UOAL

SH0319

Turner, J.C. 1977.
Cemental annulations as an age criterion in North American sheep.
J. Wildl. Manage. 41(2):211-217.

Discusses using cemental annulations as an age determiinant for wild sheep in the United States. Documents the correlation between age estimated by dental annuli, to that estimated by horn segments.
Subject: PD4 RT6 Area: B Source: CWSE

SH0329

Whitehead, P.E. and E.H. McEwan. 1980.
Progesterone levels in peripheral plasma of Rocky Mountain bighorn ewes (Ovis canadesis) during the estrous cycle and pregnancy.
Can. J. Zool. 58(6):1105-1108.

Describes the progesterone level of ewes during anestrus, estrus and throughout pregnancy. The ewes were taken from Jasper National Park, Alberta.
Subject: NP3 PD4 Area: B Source: CWSE

SH0341

Wishart, W.D. 1976.
The Ram Mountain orphan lamb experiment.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:70-80.

Preliminary report of the orphan lamb experiment on Ram Mountain in Alberta. Studies the survival of selectively orphaned lambs as compared to non-orphans. The growth patterns are documented, and implications of orphaning with respect to hunting regulations and management considerations is included.
Subject: MA1 PD3 PD4 Area: B Source: AFWE

SH0337

Wishart, W.D. 1969.
Bighorns and little horns.
Alberta Lands - Forests - Parks - Wildl. 12(3):4-10.

A pamphlet explaining how growth can be measured by evaluating horn size and markings of bighorn sheep in Alberta. Describes differences in size of horns between sheep in northern Alberta and those in the southern region.
Subject: PD4 Area: C Source: CWSE

SH0344

Wishart, W.D. and D. Brochu. 1982.
An evaluation of horn and skull characters as a measure of population quality in Alberta bighorns.
Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:127-142.

Describes the measurement of population quality in Rocky Mountain bighorn sheep of Alberta by evaluating horn and skull characters. Compares animals from northern and southern Alberta, which inhabit different ranges. The study method is described as well.
Subject: PD4 RT9 Area: B Source: AFWE

SH0349

Woodard, T.N., R.J. Gutierrez and W.H. Rutherford. 1974.
Bighorn lamb production, survival, and mortality in southcentral Colorado.
J. Wildl. Manage. 38(4):771-774.

Study determined sheep distribution, lamb birth rate, survival and mortality of Rocky Mountain bighorn sheep herds in southcentral Colorado.
Subject: MF1 MF2 PD3 PD4 Area: B Source: UOAL CWSE

SH0350

Woodgerd, W. 1964.
Population dynamics of bighorn sheep of Wildhorse Island.
J. Wildl. Manage. 28(2):381-391.

Detailed study of the population dynamics of a herd of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The study period was three years, and the population information ranges over 22 years.
Subject: PD1 PD2 PD3 PD4 Area: B Source: CWSE

HISTORIC POPULATIONS (PD5)

SH0361

Bond, R.M. 1936.
Special report on bighorn sickness in Glacier National Park.
U.S. National Park Serv. Glacier National Park Files.

Documents the incidence of pneumonia and other diseases in bighorn sheep at Glacier National Park. Descriptions of the lung condition in dead animals was outlined.
Subject: DP1 DP2 PD5 Area: B Source: ANNB

SHO505

Bunnell, F.L. 1982.
The lambing period of mountain sheep: synthesis, hypothesis and tests.
Can. J. Zool. 60: 1-14.

Reviews lambing periods of 30 populations of North American mountain sheep. For all populations lambing begins later and is of shorter duration at more northern latitudes. Onset and duration of lambing are more highly correlated with the phenological index than wtih latitude alone, particularly amoung alpine populations.
Subject: PD4 PD5 Area: B Source: CWSE UOAL

SH0041

Chappel, R.W. and R.J. Hudson. 1978.
Prediction of energy expenditures by Rocky Mountain bighorn sheep.
The Proc. of the 1978 North. Wild Sheep and Goat Conf., Penticton, British Columbia. April 2-4, 1978:388-407.

Investigates various factors influencing the metabolic rate of Rocky Mountain bighorn sheep in Jasper National Park. A predictive equation based on the measurement of energy expenditures of bighorn sheep under a variety of conditions throughout the winter season was presented.
Subject: NP4 PD5 Area: B Source: AFWE

SH0415

Couey, F.M. 1966.
Rocky Mountain bighorn of Montana.
Montana Fish and Game Comm. Bull. 2.

Topics include: the early history of bighorns and their extent in North America, history and present distribution in Montana, the Sun River bighorn herd - its location and history, distribution and numbers, age classes and sex ratios, E:L ratios, life habits, forage utilization, range use, parasites and disease, predator relationships, recreational use in the area of the herd, and trapping and transplanting of these bighorn.
Subject: PD5 PD4 NP2 RA3 Area: B Source: ANNB

SH0492

Couey, F.M. 1950.
Rocky Mountain bighorn sheep of Montana.
Project 1-R, Montana Fish and Game Comm.

Complete description of the Sun River bighorn herd in Montana. Topics include history, distributions, range analysis, general behavior, predator relationships, and trapping and transplanting. A bibliography is included at the conclusion of the report.
Subject: BE2 PD5 RA1 MF3 Area: B Source: WNPL

SH0064

Demarchi, D.A 1972.
Post die-off recovery of East Kootenay bighorn sheep.
North. Wild Sheep Counc. Proc., Hinton, Alberta. 1972:22-26.

Presents a review of the total changes in numbers as a result of die-offs of various herds of bighorn sheep in the East Kootenay district of southeastern B.C.. Includes a comparison of post die-off response in two herds.
Subject: PD2 PD5 Area: A Source: KPNL

SH0067

Demarchi, D.A. 1973.
Mountain sheep management for British Columbia.
Prepared by the Bovid Management Committee. Victoria, British Columbia.

Lists distributions of four races of mountain sheep in British Columbia, their historical and present use, and population problems. In light of this, a management policy is established which protects the sheep and their habitat, educates the public, and determines public need and user demand.
Subject: MA1 PD1 PD5 Area: A Source: AFWE

SH0095

Franzmann, A.W. 1972.
Environmental sources of variation of bighorn sheep physiologic values.
J. Wildl. Manage. 36(3):924-932.

Documents the techniques used and the results obtained for the study of physiologic values of bighorn sheep from British Columbia, Alberta, Wyoming, Montana and Washington. Illustrates how physiologic values can be used to determine environmental conditions.
Subject: NP3 PD5 RT9 Area: B Source: CWSE

SH0405

Game., Idaho Dept. of Fish and 1950.
Bighorn sheep receive study to determine management requirements.
Idaho Wildl. Review Aug.-Sept., 1950:3,9.

A history of bighorn sheep numbers and a description of the animal were given.
Subject: PD3 PD5 Area: B Source: ANNB

SH0111

Geist, V. 1972.
On the significance of thermoclines to the biology of wintering mountain sheep.
North. Wild Sheep Counc. Symp., Hinton, Alberta. April 11-13, 1972: 75-76.

Investigates the question of why mountain sheep frequent high elevations during mid-winter.
Subject: RA5 BE2 PD5 Area: A Source: KPNL

SH0481

Geist, V. 1971.
Mountain sheep : a study in behavior and evolution.
Univ. of Chicago Press. Chicago.
Subject: BE1 PD5 Area: B Source: CWSE

SH0105

Geist, V. 1967.
On the behavior and evolution of American sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

Documents the results of behavior studies of Stone, Dall and Rocky Mountain bighorn sheep. Discusses the evolution of sheep in detail. Found that the primary evolutionary changes took place in social adaptations.
Subject: BE1 BE2 PD5 Area: B Source: ANNB

SH0114

Geist, V. and R.G. Petocz.
On the temporal and spatial occupation patterns of a wintering area by bighorn sheep and their theoretical implications.
The Univ. of Calgary. Calgary, Alberta.

Investigates whether sheep populations have a predictable pattern of home range occupation in time and space. Discusses spatial distributions as being affected by preference for cliff terrain, winter conditions and food habits. Some management considerations are discussed. The study area is the Palliser Range in Banff National Park, Alberta.
Subject: BE2 BE3 PD5 Area: B Source: AFWE

SH0403

Hall, J.M. 1966.
Bighorn sheep management on the national forests.
Trans. Desert Bighorn Counc. 10:47-52.

Gives historical records of bighorn sheep population estimates in the national forests. Discusses reasons for the declining populations.
Subject: PD5 MA1 Area: B Source: UOAL ANNB

SH0127

Hebert, D.M. 1974.
The effect of ambient temperatures in the winter feed intake of bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep Counc., Great Falls ,Montana. April 23-25, 1974:80-90.

Paper relates temperature to winter feed intake of bighorn sheep.
Subject: NP1 PD5 NP2 Area: A Source: CWSE

SH0367

MacArthur, R.A., V. Geist and R.H. Johnston. 1982.
Cardiac and behavioral responses of mountain sheep to human disturbance.
J. Wildl. Manage. 46(2):351-358.

Documents telemetered heart rates (HR) and behavioral responses of mountain sheep (Ovis canadensis canadensis) reacting to human disturbance in the Sheep River Wildlife Sanctuary, southwestern Alberta. The use of HR telemetry in

harrassment research is discussed as well.
Subject: NP4 PD5 RT7 Area: B Source: UOAL

SH0180

MacArthur, R.A., R.H. Johnson and V. Geist. 1979.
Factors influencing heart rate in free-ranging bighorn sheep : a physiological approach to the study of wildlife harrassment.
Can. J. Zool. 57(10):2010-2021.

Documents changes in heart rates of Rocky Mountain bighorn ewes in response to various stimuli (ie - man's activities and predators) as well as changes in the environment. Found that the heart rate can be a good indicator of the health and condition of the animal. The methods used are outlined in detail. The Sheep River Wildlife Sanctuary, Alberta was the study area.
Subject: MA4 PD5 Area: B Source: CWSE

SH0406

McCann, L.J. 1956.
Ecology of the mountain sheep.
Amer. Midland Nat. 56:297-324.

Discussed: classification and distribution, physical characteristics, evolutionary implications, origin and recent history in North America, the Gros Ventre sheep range, behavior observations, herd organization and movements , food habits, natural enemies, accidents, parasites and disease, competition.
Subject: BE2 NP2 PD1 PD5 Area: B Source: ANNB

SH0210

Packard, F.M. 1939.
Progess report on the decline and present status of the bighorn sheep in Rocky Mountain National Park, Oct. 5, 1939.
File 715-06, Library, Rocky Mountain National Park. Colorado

This report discusses the history, physiological factors, remedies, and present population (1939) studies of bighorn sheep in Rocky Mountain National Park. Documents incidence of lungworm which contributes to the declining population.
Subject: PD2 PD5 Area: B Source: ANNB

SH0215

Petocz, R.G. 1973.
The effect of snow cover on the social behavior of bighorn rams and mountain goats.
Can. J. Zool. 51:987-993.

Documents the effect of snow cover on the behavior of Rocky Mountain bighorn rams during the rutting season. The study was conducted on the Palliser Range, Banff National Park, Alberta.
Subject: RA5 PD5 BE1 Area: B Source: CWSE

SH0221

Potts, M.K. 1937.
Hemorrhagic Septicemia in the bighorn of Rocky Mountain National Park.
J. Mammal. 18(1):105-106.

Documents the incidence of Hemorrhagic septicemia in bighorn sheep of Rocky

Mountain National Park. Physical descriptions of the disease are given. Referred to lamb die-offs due to these organisms in Rocky Mountain National Park as well as in Yellowstone National Park.
Subject: DP2 PD5 Area: B Source: CWSE

SH0364

Potts, M.K. 1938.
Status of the bighorn sheep in Rocky Mountain National Park.
On file, Office of Chief Park Ranger, Rocky Mountain National Park. Colorado.

This report gave a brief history of bighorn sheep in the park and talked about their decline. Discussed range conditions as the main problem causing the declining numbers of sheep in Rocky Mountain National Park.
Subject: PD2 PD5 Area: B Source: ANNB

SH0475

Ruxton, G.F. 1932.
Wildlife in the Rocky Mountains.
The MacMillan Co. New York.

Gives a general physical description of bighorn sheep in the Rocky Mountains and outlines their distribution.
Subject: BE2 PD5 Area: B Source: ANNB

SH0424

Schallenberger, A. 1970.
Population characteristics and harvest of bighorn sheep on the Sun River Area, Montana.
Trans. North.Wild Sheep Counc. p. 24 (Abst.).

Looks at the history and physiography, forage utilization, range condition , harvest through hunting, and trapping and transplanting of a herd of bighorn sheep in the Sun River Area, Montana. The results are then compared to those of bighorn sheep in Nevada.
Subject: PD1 PD5 BE2 Area: B Source: ANNB AFWE

SH0428

Smith, D.R. 1953.
Idaho bighorn sheep studied.
Idaho Wildl. Rev. 5(5):4-7, 10.

Gives physical attributes, location, early history, losses, herd productivity, and management considerations of bighorn sheep in Idaho.
Subject: PD1 PD5 MA3 Area: B Source: ANNB

SH0359

Smith, D.R. 1954.
Life history and ecology of the bighorn sheep in Idaho.
Unpub. MSc. Thesis, Univ. of Idaho. Moscow, Idaho.

Range, physical characteristics, vegetation, life history, and some management considerations for bighorn sheep in Idaho were discussed.
Subject: PD1 PD5 RA1 RA6 Area: B Source: ANNB

SH0266

Spencer, C.C. 1943.
Notes on the life history of Rocky Mountain bighorn sheep in the Tarryall Mountains of Colorado.
J. Mammal. 24(1):1-11.

Gives general descriptions of species competition, lambing range, diseases, mortality due to predation and poaching, and reproduction of Rocky Mountain bighorn sheep in Colorado.
Subject: RA5 PD4 PD5 RA4 Area: B Source: CWSE

SH0284

Stelfox, J.G 1971.
Bighorn sheep in the Canadian Rockies : a history 1800-1970.
Can. Field Nat. 85(2):101-122.

Documents the history of bighorn sheep populations, their number and distribution, from 1800 to 1970 on the east slopes of the Rocky Mountains, and the west slopes in Kootenay National Park.
Subject: BE2 PD2 PD5 Area: A Source: KPWL CWSE

SH0504

Thompson, R.W. and J.C. Turner. 1982.
Temporal geographic variation in the lambing season of bighorn sheep.
Can. J. Zool. 60: 1781-1793.

Paper assesses the variation in lambing seasons of 22 populations of bighorn sheep from Canadian national parks to western Texas. Lambing in northern populations is cued to a brief, relatively predictable period of plant growth while southern bighorn protract lambing such that some recruitment coincides with relatively unpredicatable plant growth, triggered by erratic rains.
Subject: PD4 PD5 RA6 Area: B Source: CWSE UOAL

SH0342

Wishart, W.D. 1979.
Species management plan for the Rocky Mountain bighorn sheep in Alberta.
Alta. Fish and Wildl. Edmonton, Alberta.

Paper is in four sections as follows : (1) perspective of the North American status and management of bighorns, (2) history of bighorn sheep management in Alberta, (3) distribution and status of bighorn sheep, and (4) recommendations for future management.
Subject: MA1 MA2 MA3 PD5 Area: B Source: AFWE

HABITAT-GENERAL (RA1)

SH0006

Anonymous. 1970.
Kootenay National Park provisional master plan.
Queen's Printer for Canada. Ottawa, Canada.

Outlines Kootenay National Park's land use plans, park programs, natural resources, visitor use data and future studies and planning projects. It is a good reference for the history and general ecology of the park.
Subject: RA1 RA6 BE3 Area: A Source: AFWE

SH0013

Banfield, A.W.F. 1974.
The mammals of Canada. (pp. 413-416).
The Univ. of Toronto Press. Toronto, Canada.

Gives status and distribution of bighorn sheep in North America and Canada as well as a discussion of morphology, habits, habitat, reproduction, and taxonomy plus references.
Subject: RA1 BE1 PD3 Area: C Source: KPNL CWSE UOAL

SH0015

Bear, G.D.. 1979.
Evaluation of bighorn transplants in two Colorado localities.
Colorado Div. of Wildl., Special Report #45.

Evaluates the short term responses of bighorn sheep following transplanting into suitable ranges adjacent to areas presently occupied by bighorn sheep. Also discusses the ecology of each study area and the methods used. The study areas are Cache la Poudre Canyon and Cebolla Creek Wildlife Area in Colorado.
Subject: MA1 RA1 RT6 Area: B Source: AFWE

SH0447

Brooks, A. 1923.
The Rocky Mountain sheep in British Columbia.
Can. Field Naturalist 37(2):23-25.

The range and location of sheep in British Columbia, as well as their enemies and diseases were discussed. The paper also refutes statements by Hewitt (1921).
Subject: MF1 MF3 RA1 RA4 Area: A Source: ANNB UOAL

SH0448

Couey, F.M. 1955.
Montana bighorn sheep.
Proc. 35th Annual Conf. of Western Assoc. of State Game and Fish Comm. 35:162-166.

Gave the present status, trapping and transplanting operations, mortality factors, and range conditions of bighorn sheep in Montana.
Subject: PD1 MA3 MF1 RA1 Area: B Source: ANNB

SH0492

Couey, F.M. 1950.
Rocky Mountain bighorn sheep of Montana.
Project 1-R, Montana Fish and Game Comm.

Complete description of the Sun River bighorn herd in Montana. Topics include history, distributions, range analysis, general behavior, predator relationships, and trapping and transplanting. A bibliography is included at the conclusion of the report.
Subject: BE2 PD5 RA1 MF3 Area: B Source: WNPL

SH0059

Davis, W.B. and W.P. Taylor. 1939.
The bighorn sheep of Texas.
J. Mammal. 20:440-455.

Outlines geography, distribution, habits, etc. for bighorn sheep in Texas. Reasons for the small population were given as overhunting, eagle predation, competition and the initial small number.
Subject: RA1 PD1 BE2 Area: B Source: UOAL

SH0060

Demarchi, D.A. 1966.
Productivity of the Stoddart Creek winter range.
Fish and Wildlife Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

This report outlines the methods and techniques used to estimate productivity of the bighorn sheep winter range at Stoddart Creek in southeastern British Columbia. Forage sample descriptions are compiled for each site.
Subject: RA1 RT4 BE3 Area: A Source: KPNL

SH0117

Green, H.U. 1949.
The bighorn sheep of Banff National Park.
Dept. Services Branch, National Parks and Historic Sites Service. Ottawa, Canada.

A general description of bighorn sheep at Banff National Park. Topics include range description, diseases and parasites, population, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: B Source: CWSE

SH0123

Harrison, G., R. Hooper and P. Jacobson. 1982.
Ungulate population statistics and habitat analysis.
Natural History Research Div., Western Region, Parks Canada.

An investigation into the effect the Trans-Canada Highway has on ungulate mortality. The area of the highway studied is from the Banff National Park East gate to the Sunshine turn-off. In addition, the article briefly studies habitat and population distributions of elk, mule deer, white-tailed deer and bighorn sheep.
Subject: MF2 RA1 PD1 Area: B Source: KPWL

SH0134

Hoffman, W.H. 1971.
The limiting factors controlling the Ram Mountain bighorn sheep herd.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Presents details of the limiting factors regulating bighorn sheep numbers which directly and indirectly affect the differential survival of the various age groups within the population. Outlines the ecology and climate of the range, sheep population, natality and seasonal distributions, and gives detailed techiques.
Subject: RA1 PD1 BE2 Area: B Source: AFWE

SH0152

Hudson, R.J. and J.G. Stelfox. 1976.
Populations and diseases of bighorn sheep of the Canadian Rockies : a systems dynamics approach.
Can. Wildl. Serv. Edmonton, Alberta.

Data was based on longterm studies of range ecology, parasitism and population dynamics. Areas of study included Jasper, Banff and Waterton National Parks. The paper analyzed a system dynamics approach to the problem of sheep die-offs in the Canadian Rockies.
Subject: PD1 PD2 DP2 RA1 Area: A Source: CWSE

SH0176

Lawson, B. and R. Johnson. 1983.
Mountain sheep (Ovis canadensis and Ovis dalli). In Chapman, J.A. and G.A. Feldhamer, eds. Wild mammals of North America - biology, management and economics.
The John Hopkins Univ. Press. Baltimore, Maryland.

Discusses general disribution, physical description, physiology, reproduction, ecology of range, food habits, behavior, mortality factors (including diseases and parasites), a list of gastrointestinal nematodes of wild sheep, age determination, population dynamics and management considerations for thinhorn and bighorn sheep in North America.
Subject: DP1 MA1 NP2 RA1 Area: B Source: AFWE

SH0196

McCann, L.J. 1953.
Ecology of the mountain sheep.
PhD. Thesis, Univ. of Utah. Salt Lake City, Utah.

The zoogeography, distribution, range conditions, diseases, competition, and social interactions of the genus Ovis in the United States are dicussed.

Subject: RA1 BE1 BE2 DP1 Area: B Source: ANNB

SH0194

Mussell, D.J. 1982.
Utilization of the Kootenay Plains of western Alberta by ungulates.
Dept. Energy and Natural Resources, Alta. Prov. Govt. Edmonton, Alberta.

Describes ungulate use of the Kootenay Plains of western Alberta. Methods are first described in detail, and then present and past habitat use is stated. Included is the ecology of the study area. In light of the discussion, some proposed regional developments are given.
Subject: RA1 BE2 BE3 MA1 Area: B Source: AFWE

SH0211

Packard, F.M. 1946.
An ecological study of the bighorn sheep in Rocky Mountain National Park, Colorado.
J. Mammal. 27(1):3-28.

A general study of Rocky Mountain bighorn sheep in Colorado. Topics discussed include habitat, population distribution, ranges and mortality factors. Also included is a study of reasons for the population decline.
Subject: RA1 RA4 PD1 MF1 Area: B Source: CWSE

SH0496

Schmidt, J.L. and eds. D.L. Gilbert 1980.
Big game of North America, ecology and management.
Stackpole Books. Harrisburg, Pennsylvania.

A good reference on the ecology and management of the big game of North America. Includes short articles on various animals, and concludes with a series of reports dealing specifically with habitat, and management problems.
Subject: BE1 PD1 RA1 MA1 Area: B Source: AFWL

SH0251

Shannon, N.M., R.J. Hudson V.C. Brink and W.D. Kitts. 1975.
Determinants of spatial distribution of Rocky Mountain bighorn sheep.
J. Wildl. Manage. 39(2):387-401.

Relates seasonal distributions of Rocky Mountain bighorn sheep in southeastern British Columbia to various factors dealing with the range. Some aspects of range are slope, elevation and nitrogen content of palatable grasses.
Subject: BE2 RA1 Area: A Source: CWSE UOAL

SH0359

Smith, D.R. 1954.
Life history and ecology of the bighorn sheep in Idaho.
Unpub. MSc. Thesis, Univ. of Idaho. Moscow, Idaho.

Range, physical characteristics, vegetation, life history, and some management considerations for bighorn sheep in Idaho were discussed.
Subject: PD1 PD5 RA1 RA6 Area: B Source: ANNB

SH0261

Smith, I. and R. Demarchi. 1969.
Mountain sheep in British Columbia.
B.C. Fish and Wildl. Branch. Victoria, British Columbia.

A general description of mountain sheep in the Rocky Mountains of British Columbia. Topics include habitat, population distributions, behavior and mortality factors.
Subject: RA1 PD1 BE1 MF1 Area: A Source: KPWL

SH0281

Stelfox, J.G. 1969.
Status of bighorn sheep at Vermilion Lakes, Banff National Park, May 1969.
Can. Wildl. Serv. Edmonton, Alberta.

This paper outlines the range conditions and general population status of the Vermilion Lakes herd of bighorn sheep. Some management suggestions for this particular herd are included.
Subject: RA1 MA1 BE2 Area: B Source: CWSE KPWL

SH0279

Stelfox, J.G. 1968.
Population dynamics and range ecology of bighorn sheep in Rocky Mountain national parks. Phase 1 : population fluctuations of bighorn sheep in the Canadian Rocky Mountains from 1800 to 1967.
Can. Wildl. Serv. Edmonton, Alberta.

The report gives a detailed history of population dynamics of bighorn sheep of the East slopes of the Rocky Mountains in Alberta. Environmental factors were analyzed in order to determine their role in the population fluctuations.
Subject: PD2 RA1 MF1 BE2 Area: A Source: CWSE

SH0488

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
Can. Wildl. Serv. Rep. Series No. 39.
Subject: RA1 RA2 RA3 RA6 Area: A Source: CWSE

SH0282

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Canadian Rocky Mountain national parks, 1966-1971.
Can. Wildl. Serv. Edmonton, Alberta.

Documents die-offs, seasonal distributions, range conditions and diseases and parasites of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Relates these factors to animal conditions, reproduction and mortality.
Subject: PD2 RA1 DP1 MF1 Area: A Source: CWSE

SH0303

Stelfox, J.G. and R.D. Taber. 1969.
Big game in the northern Rocky Mountain coniferous forest.
Coniferous Forests of the Rocky Mountains : Proc. 1968 Symp.:197-222.

Discusses range vegetation, seasonal distributions and management techniques for big game (wapiti, deer, moose, caribou, bison, mountain goats and bighorn sheep) in the coniferous forest of the northern Rocky Mountains.
Subject: RA1 BE2 MA2 Area: B Source: CWSE

SH0307

Streeter, R.G. 1969.
Demography of two Rocky Mountain bighorn sheep populations in Colorado.
Unpub. PhD. Thesis, Colorado State Univ. Fort Collins, Colorado.

Studies the change in range ecology, population growth and mortality over a four year study period of 2 Rocky Mountain bighorn sheep populations at Buffalo Peaks, Colorado. Discusses hunting and nutritional deficiencies affecting population declines and range usage.
Subject: RA1 PD2 PD4 MA4 Area: B Source: ANNB

RANGE CONDITION AND TREND (RA2)

SH0414

Bandy, P.J. 1970.
The paradox of the bighorn sheep.
Trans. North. Wild Sheep Counc. pp. 1-4.

Discusses the deteriorating range conditions of bighorn sheep as being responsible for outbreaks of disease, and various other types of stress. Outlines management objectives to deal with this problem.
Subject: RA2 MA2 Area: B Source: ANNB AFWE

SH0014

Barmore, W.J. 1962.
Bighorn sheep and their habitat in Dinosaur Monument.
MSc. Thesis, Utah State Univ. Logan, Utah.

Describes the ecology, condition, utilization and geography of the Dinosaur Monument sheep range. Bighorn sheep population dynamics and some diseases are described as well. Management considerations are included.
Subject: RA2 RA3 BE3 PD1 Area: B Source: ANNB

SH0058

Dale, A.R. and J.A. Bailey. 1982.
Application of optimal foraging theory for bighorn sheep habitat evaluation.
Third Biennial Symp. of the North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:254-261.

Describes a method for measuring forage efficiency of bighorn sheep in Waterton Canyon, Colorado. The method uses the optimal foraging theory and relates it to the distribution and sizes of potential bites, and availability for efficient harvest by bighorns.
Subject: RA2 BE3 NP2 RT4 Area: B Source: AFWE

SH0062

Demarchi, D.A. 1971.
Ecology of big game winter ranges in the southern Rocky Mountain Trench, East Kootenay region.
B.C. Fish and Wildlife Branch. Victoria, British Columbia.

Describes in detail the condition, utilization, quality and floral phenology of the big game winter ranges in the East Kootenay region of B.C. Includes a discussion of the effects of the flooding of the Libby Reservoir and possible livestock reductions in that area.
Subject: RA2 RA3 RA4 RT4 Area: A Source: CWSE

SH0066

Demarchi, R. and P. Davidson. 1982.
East Kootenay bighorn sheep habitat enhancement.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A report dealing with management techniques designed to preserve and increase the population of Rocky Mountain bighorn sheep. Included is specific data on range conditions, the pneumonia-lungworm disease and various research techniques.
Subject: MA2 RA2 RA3 DP2 Area: A Source: CWSE

SH0416

Demarchi, R.A. 1965.
An ecological study of the Ashnola bighorn winter ranges.
MSc. Thesis, Univ. of British Columbia. Vancouver, British Columbia.

Investigates the composition, floral phenology, productivity, utilization and soils of the Ashnola bighorn winter range. Includes discussion of the effects of overgrazing by bighorn and cattle.
Subject: RA2 RA3 RA6 NP2 Area: B Source: ANNB

SH0138

Honess, R.F. and N.M. Frost. 1942.
A Wyoming bighorn sheep study.
Wyoming Fish and Game Dept. Bulletin #1.

Studied population size and distributions of bighorn sheep in Wyoming. Decimation factors were considered. Some suggested factors were insufficient and deficient winter forage, and contagious ecthyma in lambs and adults. Recommendations for supplemental feeding were made.
Subject: BE2 DP2 MA3 RA2 Area: B Source: ANNB

SH0483

Johnson, J.D. 1975.
An evaluation of the summer range of bighorn sheep (Ovis canadensis canadensis) on Ram Mountain, Alberta.
MSc. Thesis, Univ. of Calgary. Calgary, Alberta.
Subject: RA2 RA3 RA5 RA6 Area: B Source: CWSE

SH0170

Lacy, C. 1971.
A case for the bighorn sheep.
Alta. Fish and Wildl. Hinton, Alberta.

Discusses deteriorating bighorn range conditions on the eastern slopes of the Rocky Mountains, Alberta, as being caused by man's activities - in particular, mining. Discusses various effects mining has on the land, and suggests some management procedures.
Subject: RA2 RA5 MA4 Area: B Source: AFWE

SH0469

Longhurst, W.M. 1951.
Range conditions as an influence on big game productivity.
Proc. Annual Conf. of Western Assoc. of State Game and Fish Comm. 31: 190-194.

Discusses the relationship between range condition and trend and the productivity of the animals living on the range.
Subject: RA2 Area: B Source: ANNB

SH0486

Ogilvie, R.T. 1969.
The mountain forest and alpine zones of Alberta. In Vegetation, soils and wildlife : process and method in Canadian geography. Nelson, J.G. and M.J. Chambers (eds.). pp. 25-44.
Metheun Publ. Toronto.
Subject: RA2 RA3 RA6 Area: B Source: CWSE

SH0208

Oldemeyer, J.L. 1966.
Winter ecology of bighorn sheep in Yellowstone National Park.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents results of a bighorn sheep study conducted on the northern winter range of Yellowstone National Park, Wyoming. Range condition and utilization, animal population numbers, and competition between elk and sheep are discussed.
Subject: RA2 RA3 RA4 BE3 Area: B Source: ANNB

SHO506

Peck, J.M., D.A. Demarchi R.A. Demarchi and D.E. Stucker. 1984.
Bighorn sheep and fire: seven case histories.
Paper presented at Symposium on Fire Effects on Wildlife Habitat, Missoula, Montana, March 21, 1984.

Responses of seven bighorn sheep populations and habitats to prescribed fire and wildlife in southern B.C., Idaho and Glacier National Park, Montana are reported. Lists factors to be considered before prescribed fire is used in bighorn habitats.
Subject: RA2 RA3 MA2 Area: A Source: BFWV CWSE

SH0229

Riggs, R.A. and J.M. Peek. 1980.
Mountain sheep habitat-use patterns related to post-fire succession.
J. Wildl. Manage. 44(4):933-938.

Investigates the longterm effects of fire on the use of mountain sheep winter ranges in Glacier National Park. Includes the relationship of climate and vegetation to range use.
Subject: RA2 RA6 BE3 Area: B Source: CWSE

SH0474

Rush, W.M. 1942.
Wild animals of the Rockies.
Harper Brothers. New York.

Gives a general description of bighorn sheep in the Rocky Mountains. Topics include disease, range condition as affecting the health of the animals, some behavior, and the activities of man affecting the herds.
Subject: DP2 RA2 BE1 Area: B Source: ANNB

SH0285

Stelfox, J.G 1971.
Biotic - abiotic factors influencing forage palatability, preference and range carrying capacity.
Can. Wildl. Serv. Edmonton, Alberta.

Investigates various factors affecting forage palatability, preference, utilization and carrying capacity. Paper is divided between biotic and abiotic factors. The study area is not confined to any specific region, and various mammals are involved.
Subject: RA2 RA3 RA6 Area: C Source: CWSE

SH0283

Stelfox, J.G. 1970.
Population dynamics and range ecology of bighorn sheep in the Rocky Mountain national parks.
Can. Wildl. Serv. Edmonton, Alberta.

Documents population fluctuations, abundance and distribution, diseases and parasitism, and the ecology of the winter ranges of bighorn sheep in Kootenay, Waterton, Banff and Jasper National Parks.
Subject: PD4 BE2 DP1 RA2 Area: A Source: CWSE

SH0290

Stelfox, J.G. 1974.
Range ecology of bighorn sheep in relation to self - regulation theories.
Can. Wildl. Serv. Edmonton, Alberta.

A study documenting population dynamics of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. When attempting to determine the reasons for fluctuating sheep populations, diseases, parasites and range conditions were studied.
Subject: DP1 RA2 RA4 RA6 Area: A Source: CWSE

SH0280

Stelfox, J.G. 1969.
Ungulates as primary consumers.
Lecture presented at 8'th Annual Regional Park Warden 2 School, May 27, 1969 at Jasper National Park.

Discusses the relationships of wild ungulates to plant associations, and the effects of environmental carrying capacities, seasonal changes in forage nutrition and palatability, and climate on ungulates in the Canadian Rocky Mountains. Some general population distributions are included as well.
Subject: BE3 RA2 RA4 RA5 Area: A Source: CWSE

SH0488

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
Can. Wildl. Serv. Rep. Series No. 39.
Subject: RA1 RA2 RA3 RA6 Area: A Source: CWSE

SH0289

Stelfox, J.G. 1974.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
PhD. Thesis, Univ. of Montana. Missoula, Montana.

Detailed documentation of the range ecology of the Rocky Mountain bighorn sheep on six winter ranges in Jasper, Banff and Waterton National Parks. Population fluctuations, parasitism and some management techniques are discussed.
Subject: RA2 RA3 RA4 RA5 Area: B Source: CWSE

SH0271

Stelfox, J.G. 1966.
An investigation of the current status of bighorn sheep (Ovis canadensis canadensis) in the Radium Hot Springs Area, B.C.
Can. Wildl. Serv. Edmonton, Alberta.

This study documents the status of bighorn sheep in the Radium Hot Springs area, British Columbia. Includes range condition and trend, herd population and distributions as well as diseases and parasites affecting the sheep.
Subject: RA2 BE2 DP2 Area: A Source: CWSE KPNL

SH0272

Stelfox, J.G. 1966.
Bighorn and Rocky Mountain goat populations, reproductions, harvests and proposed 1966 seasons.
Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Documents population, reproduction and harvests of bighorn sheep and Rocky Mountain goats in the Coalbranch region, Alberta. Range condition, trend, and climates are discussed for this area. Some management considerations with respect to harvesting are also outlined.
Subject: PD4 RA2 MA1 MF4 Area: B Source: CWSE

SH0270

Stelfox, J.G. 1964.
Bighorn management problems in the Coalbranch Region.
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Summarizes range conditions, trend, utilization, and vegetation of bighorn sheep in the Coalbranch region, Alberta. In light of population dynamics and behavior, some management techniques are discussed for these herds.
Subject: RA2 RA3 MA2 MA3 Area: B Source: CWSE

SH0275

Stelfox, J.G. 1967.
Bighorn sheep abundance and distribution in Banff, Jasper, Waterton Lakes and Kootenay National Parks, 1966-1967.
Can. Wildl. Serv. Edmonton, Alberta.

Presents data on populations and distributions (especially seasonal abundance and herd distributions). The populations are correlated to range conditions and trends, and these are investigated as to their responsibility for population declines.
Subject: PD2 BE2 RA2 Area: A Source: CWSE

SH0302

Stelfox, J.G. and D.J. Spalding. 1974.
Bighorn sheep ecology study, Vaseux - Bighorn Wildlife Area.
Can. Wildl. Serv. Edmonton, Alberta.

Documented population dynamics and range conditions in order to recommend range rejuvenation. The herds were made up of California bighorn sheep in the south Okanagan Valley.
Subject: RA2 RA4 RA6 MA2 Area: B Source: CWSE

SH0312

Tanner, H.C. 1950.
Investigation into the competition between elk and big-horned sheep in the Cascade Valley, Banff National Park, 1950.
Can. Wildl. Serv. Edmonton, Alberta.

Documents the condition of the alpine meadows in the Cascade Valley, and discusses competition between elk and bighorn sheep in that area, with respect to range utilization.
Subject: RA2 RA4 BE3 Area: B Source: CWSE

SH0326

Vogel, W.G. and G.M. Van Dyke. 1966.
Vegetation responses to grazing management on a foothill sheep range.
J. Range Manage. 19(2):80-85.

Report outlines how a central Montana foothill range was subject to grazing management, and the vegetation's response to the treatment.
Subject: MA2 RA2 Area: B Source: CWSE

RANGE PRODUCTION, UTILIZATION AND QUALITY (RA3)

SH0014

Barmore, W.J. 1962.
Bighorn sheep and their habitat in Dinosaur Monument.
MSc. Thesis, Utah State Univ. Logan, Utah.

Describes the ecology, condition, utilization and geography of the Dinosaur Monument sheep range. Bighorn sheep population dynamics and some diseases are described as well. Management considerations are included.
Subject: RA2 RA3 BE3 PD1 Area: B Source: ANNB

SH0019

Bentz, J.A. 1981.
Effects of fire on the subalpine range of Rocky Mountain bighorn sheep in Alberta.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Study objectives were: (1) to determine differences in the quantity and quality of available forage between burned and adjacent unburned forest sites, (2) to assess the factors which may limit or contribute to the use of fire-disturbed sites by bighorn sheep, and (3) to assess the effects of burning on the establishment and growth of important range plants commonly used by bighorn sheep. The study areas were: Ghost River, Rock Creek, Ram Mountain and Cadomin Mountain, Alberta.
Subject: RA3 MA2 Area: B Source: AFWE

SH0415

Couey, F.M. 1966.
Rocky Mountain bighorn of Montana.
Montana Fish and Game Comm. Bull. 2.

Topics include: the early history of bighorns and their extent in North America, history and present distribution in Montana, the Sun River bighorn herd - its location and history, distribution and numbers, age classes and sex ratios, E:L ratios, life habits, forage utilization, range use, parasites and disease, predator relationships, recreational use in the area of the herd, and trapping and transplanting of these bighorn.
Subject: PD5 PD4 NP2 RA3 Area: B Source: ANNB

SH0053

Cowan, I.McT. 1950.
Some vital statistics of big game on overstocked mountain range.
Trans. of the Fifteenth North Amer. Wildl. Conf., San Francisco, California. March 6,7,9, 1950:581-588.

Outlines the sex ratios, fertility and effective reproduction of big game animals on overstocked mountain ranges in Jasper, Banff, Kootenay and Yoho national parks. Includes a description of range vegetation and utilization.
Subject: PD1 PD4 RA3 BE3 Area: A Source: UOAL

SH0061

Demarchi, D.A. 1967.
An ecological study of Rocky Mountain bighorn sheep winter ranges on the East Kootenay region of British Columbia.
Fish and Wildl. Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

Detailed study into the ecology of the East Kootenay region, using methods such as range composition, enclosures, productivity rating, animal distribution, soil and climatological stations. Documents various ecological factors of the following ranges: Bull River, Wigwam Flats, Premier Ridge, Columbia Lake and Stoddart Creek bighorn winter ranges. Management proposals for each region are included.
Subject: RA3 RA6 MA1 RT4 Area: A Source: BFWV CWSE

SH0062

Demarchi, D.A. 1971.
Ecology of big game winter ranges in the southern Rocky Mountain Trench, East Kootenay region.
B.C. Fish and Wildlife Branch. Victoria, British Columbia.

Describes in detail the condition, utilization, quality and floral phenology of the big game winter ranges in the East Kootenay region of B.C. Includes a discussion of the effects of the flooding of the Libby Reservoir and possible livestock reductions in that area.
Subject: RA2 RA3 RA4 RT4 Area: A Source: CWSE

SH0066

Demarchi, R. and P. Davidson. 1982.
East Kootenay bighorn sheep habitat enhancement.
B.C. Fish and Wildlife Branch. Cranbrook, British Columbia.

A report dealing with management techniques designed to preserve and increase the population of Rocky Mountain bighorn sheep. Included is specific data on range conditions, the pneumonia-lungworm disease and various research techniques.
Subject: MA2 RA2 RA3 DP2 Area: A Source: CWSE

SH0416

Demarchi, R.A. 1965.
An ecological study of the Ashnola bighorn winter ranges.
MSc. Thesis, Univ. of British Columbia. Vancouver, British Columbia.

Investigates the composition, floral phenology, productivity, utilization and soils of the Ashnola bighorn winter range. Includes discussion of the effects of overgrazing by bighorn and cattle.
Subject: RA2 RA3 RA6 NP2 Area: B Source: ANNB

SH0109

Geist, V. 1971.
A behavioral approach to the management of wild ungulates.
11'th Symp. of the Brit. Ecol. Soc., The Univ. of East Anglia, Norwich. July 7-9, 1970.

Describes how wild ungulates (including bighorn sheep in Alberta and B.C.) cope with man's activities and disturbances on their natural habitat. Various

physical changes are described as being a result of harrassment. and a change of range utilization is discussed. Wildlife management objectives are outlined, in light of the discussion.
Subject: RA3 BE1 BE2 MA4 Area: C Source: AFWE

SH0125

Hebert, D.M. 1972.
Forage and serum phosphorous values for bighorn sheep.
J. Range Manage. 25(4):292-296.

Documents forage and serum phosphorous values for winter and summer range forages in the East Kootenay region of British Columbia. Sheep studied were Rocky Mountain bighorn.
Subject: RA3 NP2 Area: A Source: KPNL CWSE

SH0482

Hudson, R.J., W.D. Kitts and V.C. Brink. 1972.
Habitat utilization by wildlife and livestock in the southern Rocky Mountain Trench, British Columbia.
Progress Report 1972 to Environment Canada, Can. Wildl. Serv. Edmonton, Alberta.
Subject: RA3 BE3 Area: B Source: CWSE

SH0151

Hudson, R.J., W.D. Kitts and V.C. Brink. 1972.
Habitat utilization by wildlife and livestock in the southern Rocky Mountain Trench, British Columbia.
Environment Canada.

Discusses habitat use by cattle, deer, elk and bighorn sheep in the southern Rocky Mountain trench in British Columbia. Range production and utilization, habitat, competition, nutrition, distributions, and some techniques for the study are included.
Subject: RA3 RA4 BE2 BE3 Area: A Source: CWSE

SH0156

Jensen, C.H., A.D. Smith and G.W. Scotter. 1972.
Guidelines for grazing sheep on rangelands used by big game in winter.
J. Range Manage. 25(5):346-352.

Discusses forage competition between big game and domestic sheep in northern Utah on a big game winter range. Outlines possible management techniques to minimize this competition.
Subject: RA3 RA4 RA6 MA2 Area: B Source: CWSE

SH0483

Johnson, J.D. 1975.
An evaluation of the summer range of bighorn sheep (Ovis canadensis canadensis) on Ram Mountain, Alberta.
MSc. Thesis, Univ. of Calgary. Calgary, Alberta.
Subject: RA2 RA3 RA5 RA6 Area: B Source: CWSE

SH0167

Krajina, V.J. 1959.
Bioclimatic zones in British Columbia.
The Univ. of British Columbia. Vancouver, British Columbia.

Gives a very detailed description of the climatic zones throughout British Columbia. A list of vegetation and soil type for each region is given as well.
Subject: RA3 RA6 Area: B Source: CWSE

SH0177

Laycock, W.A., H. Buchanan and W.C. Krueger. 1972.
Three methods of determining diet, utilization, and trampling damage on sheep ranges.
J. Range Manage. 25(5):352-356.

A report discussing and comparing three sampling methods (esophageal fistula, paired plot and ocular utilization estimates) to determine diet, utilization, and trampling damage on sheep ranges. Study was conducted in southwestern Montana.
Subject: RT4 RT11 RA3 Area: B Source: CWSE KPNL

SH0408

Morgan, J.K. 1970.
Rocky Mountain bighorn sheep investigations.
Idaho Dept. Fish and Game. Boise, Idaho.
F.A. Idaho Project No. W-142-R.

Discusses range utilization and condition, and food preferences of Rocky Mountain bighorn sheep which had been transplanted in 1969 to Morgan Creek and the East Fork of the Salmon River, Idaho.
Subject: RT4 RA3 RA6 Area: B Source: ANNB

SH0486

Ogilvie, R.T. 1969.
The mountain forest and alpine zones of Alberta. In Vegetation, soils and wildlife : process and method in Canadian geography. Nelson, J.G. and M.J. Chambers (eds.). pp. 25-44.
Metheun Publ. Toronto.
Subject: RA2 RA3 RA6 Area: B Source: CWSE

SH0208

Oldemeyer, J.L. 1966.
Winter ecology of bighorn sheep in Yellowstone National Park.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents results of a bighorn sheep study conducted on the northern winter range of Yellowstone National Park, Wyoming. Range condition and utilization, animal population numbers, and competition between elk and sheep are discussed.
Subject: RA2 RA3 RA4 BE3 Area: B Source: ANNB

SHO506

Peck, J.M., D.A. Demarchi R.A. Demarchi and D.E. Stucker. 1984.
Bighorn sheep and fire: seven case histories.
Paper presented at Symposium on Fire Effects on Wildlife Habitat, Missoula, Montana, March 21, 1984.

Responses of seven bighorn sheep populations and habitats to prescribed fire and wildlife in southern B.C., Idaho and Glacier National Park, Montana are reported. Lists factors to be considered before prescribed fire is used in bighorn habitats.
Subject: RA2 RA3 MA2 Area: A Source: BFWV CWSE

SH0285

Stelfox, J.G 1971.
Biotic - abiotic factors influencing forage palatability, preference and range carrying capacity.
Can. Wildl. Serv. Edmonton, Alberta.

Investigates various factors affecting forage palatability, preference, utilization and carrying capacity. Paper is divided between biotic and abiotic factors. The study area is not confined to any specific region, and various mammals are involved.
Subject: RA2 RA3 RA6 Area: C Source: CWSE

SH0270

Stelfox, J.G. 1964.
Bighorn management problems in the Coalbranch Region.
Wildl. Investigations, Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Summarizes range conditions, trend, utilization, and vegetation of bighorn sheep in the Coalbranch region, Alberta. In light of population dynamics and behavior, some management techniques are discussed for these herds.
Subject: RA2 RA3 MA2 MA3 Area: B Source: CWSE

SH0293

Stelfox, J.G. 1976.
Determination of ungulate carrying capacities in national parks.
Can. Wildl. Serv. Edmonton, Alberta.
Palisades Training School, March 1 and 2, 1976. Ungulate Management.

Discusses the methods by which one can determine the range carrying capacity of ungulates in national parks. The carrying capacity is considered from a grazing capacity standpoint with respect to possible management objectives.
Subject: RA3 RT4 MA2 Area: C Source: CWSE

SH0295

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep.
Ministery of Fisheries and the Environment, Can. Wildl. Serv. Edmonton, Alberta.
Can. Wildl. Report Series, No. 39.

Investigates range ecology in Jasper, Banff and Waterton National Parks. Documents production, utilization, vegetation, climate, and methods used. The summary relates range condition to population die-offs.

Subject: RA3 RA5 RA6 RT4 Area: B Source: CWSE KPWL

SH0289

Stelfox, J.G. 1974.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
PhD. Thesis, Univ. of Montana. Missoula, Montana.

Detailed documentation of the range ecology of the Rocky Mountain bighorn sheep on six winter ranges in Jasper, Banff and Waterton National Parks. Population fluctuations, parasitism and some management techniques are discussed.
Subject: RA2 RA3 RA4 RA5 Area: B Source: CWSE

SH0488

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
Can. Wildl. Serv. Rep. Series No. 39.
Subject: RA1 RA2 RA3 RA6 Area: A Source: CWSE

SH0305

Stewart, S.T. 1975.
Ecology of the West Rosebud and Stillwater bighorn sheep herds, Beartooth Mountains, Montana.
Project W-120-R-6 and 7, Statewide Wildl. Research, State of Montana.

Studies population, range use, food habits and movements of bighorn sheep in the Beartooth Mountains, Montana. Documents habitat types, total standing crop of forage and protein content of principle forage species in order to evaluate possible effects on the bighorn sheep.
Subject: RA3 BE2 BE3 NP2 Area: B Source: AFWE

COMPETITION AND OVERLAP (RA4)

SH0001

Adams, L.G., K.L. Risenhoover and J.A. Bailey. 1982.
Ecological relationships of mountain goats and Rocky Mountain bighorn sheep.
North. Wild Sheep and Goat Counc., Proc. of the Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:9-21.

Discusses the competition between mountain goats and bighorn sheep after mountain goats were introduced into Colorado. Their ecological relationships and adaptations are also discussed. Management considerations are included.
Subject: BE3 NP2 RA4 MA1 Area: B Source: AFWE

SH0030

Bodie, W.L. and W.O. Hickey. 1980.
Response of wintering bighorn sheep to a rest-rotation grazing system in central Idaho.
Proc. Biennial Symp. of the North. Wild Sheep and Goat Counc., Salmon,

Idaho. April 23-25, 1980:60-69.

Documents changes in the sex and age structure of bighorn sheep populations, using winter ranges grazed season-long by domestic livestock and ranges with a rest-rotation grazing system in the Morgan Creek area of central Idaho.
Subject: RA4 NP2 MA1 Area: B Source: AFWE

SH0447

Brooks, A. 1923.
The Rocky Mountain sheep in British Columbia.
Can. Field Naturalist 37(2):23-25.

The range and location of sheep in British Columbia, as well as their enemies and diseases were discussed. The paper also refutes statements by Hewitt (1921).
Subject: MF1 MF3 RA1 RA4 Area: A Source: ANNB UOAL

SH0034

Buechner, H.K. 1960.
The bighorn sheep in the United States, its past, present and future.
Wildl. Monographs, No. 4. A publication of The Wildl. Society

A study of Rocky Mountain bighorn sheep (as well as other sheep species) in the United States. Discusses distribution, abundance, natality, mortality, natural regulation of numbers, and relationships to vegetation and other ungulates.
Subject: BE1 PD1 MF1 RA4 Area: B Source: CWSE

SH0399

Capp, J.C. 1967.
Competition among bighorn sheep, elk, and deer in Rocky Mountain National Park, Colorado.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Describes competition among elk, bighorn sheep and deer in Rocky Mountain National Park, Colorado. Outlines range conditions, distibutions of animals, sex and age ratios and topographyof the regions.
Subject: RA4 Area: B Source: ANNB

SH0037

Capp, J.C. 1967.
Competition among bighorn sheep, elk, and deer in Rocky Mountain National Park, Colorado.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Discusses the vegetative composition and climate of the range, and the usage by various species of ungulates. The seasonal movements and distributions, occupancy of habitat types, and food preferences for each of sheep, elk and deer in Rocky Mountain National Park, Colorado, are given. Competition for range among these three ungulates is analyzed in terms of the above.
Subject: RA4 RA6 BE3 NP2 Area: B Source: CWSE

SH0044

Constan, K.J. 1972.
Winter foods and range use of three species of ungulates.
J. Wildl. Manage. 36(4):1068-1076.

Documents range use, food habits, population characteristics and interspecific relationships of bighorn sheep, mule deer and elk on the Deer Creek - Asbestos Creek winter-spring range in Gallatin Canyon, Montana.
Subject: RA4 PD1 BE3 NP2 Area: B Source: UOAL

SH0043

Constan, K.J. 1967.
Bighorn sheep range use, food habits and relationships to mule deer and elk in Gallatin Canyon.
Montana Fish and Game Dept.

Detailed description of range use, food habits and interspecific relationships of bighorn sheep, mule deer and elk. Some research techniques were also included.
Subject: RA4 BE3 NP2 RT4 Area: B Source: CWSE

SH0048

Cooperrider, A.Y. 1969.
Competition for food between mule deer and bighorn sheep on Rock Creek winter range, Montana.
MSc. Thesis, The Univ. of Montana. Missoula, Montana.

A detailed analysis of competition for food between mule deer and bighorn sheep (Ovis canadensis) in western Montana. Some information on management is included in light of the problem of the declining numbers of sheep.
Subject: RA4 MA1 Area: B Source: CWSE

SH0052

Cowan, I.McT. 1947.
Range competition between mule deer, bighorn sheep and elk in Jasper Park, Alberta.
Trans. of the Twelfth North Amer. Wildl. Conf., San Antonio, Texas. Feb. 3-5, 1947:223-227.

Discusses competition with respect to forage preferences of mule deer, bighorn sheep and elk in Jasper National Park, Alta. Documents types of plants, and the percentage of total feed for the animals.
Subject: RA4 NP2 Area: B Source: UOAL

SH0062

Demarchi, D.A. 1971.
Ecology of big game winter ranges in the southern Rocky Mountain Trench, East Kootenay region.
B.C. Fish and Wildlife Branch. Victoria, British Columbia.

Describes in detail the condition, utilization, quality and floral phenology of the big game winter ranges in the East Kootenay region of B.C. Includes a discussion of the effects of the flooding of the Libby Reservoir and possible livestock reductions in that area.
Subject: RA2 RA3 RA4 RT4 Area: A Source: CWSE

SH0501

Eastman, D.S. 1972.
Current knowledge of ungulate competition in southern British Columbia. In Interactions between cattle and wild ungulates in southern B.C., J.E. Miltmore, ed.
Proc. Informal Work Planning Meeting, Kamloops, B.C. Sept. 28-29, 1972: 40-51.

Discusses wild-domestic ungulate competition in various regions of southern B.C. Gives a list of measurements which must be obtained in order to determine the level of competition. Management suggestions are made for decreasing the level of competition.
Subject: RA4 NP2 MA2 Area: B Source: LARS

SH0471

Flook, D.R. 1964.
Range relationships of some ungulates native to Banff and Jasper National Parks, Alberta.
Symp. on Grazing by British Ecol. Soc., Bangor, North Wales. April 1962: 119-128.

The range relationships of five ungulate species native to Banff and Jasper National Parks in the Rocky Mountains of Alberta are discussed : mountain goats (Oreamnos americana), bighorn sheep (Ovis canadensis), mule deer (Odocoileus hemionus), moose (Alces alces), and elk (Cervus elaphus). Outlines in detail their forage habits, and the effects of interspecific competition.
Subject: RA4 Area: B Source: ANNB

SH0113

Geist, V. 1974.
On the management of mountain sheep : theoretical considerations.
Paper presented at : North. Wild Sheep Counc., Great Falls, Montana. April, 1974.

Discusses the management of mountain sheep (Ovis canadensis and Ovis dalli) in relation to their biology.
Subject: MA1 MA2 RA4 BE3 Area: B Source: CWSE

SH0116

Goodson, N.J. 1982.
Effects of domestic sheep grazing on bighorn sheep populations : a review.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:287-313.

Reviews the effects of domestic sheep grazing on the ranges of Rocky Mountain bighorn sheep populations in the Big-Belt Mountains of westcentral Montana. The paper is divided into three categories : competition for forage, space, and transmission of diseases. Included are recent reports of die-offs and transplants of sheep in various areas of North America.
Subject: RA4 DP1 PD2 Area: A Source: AFWE

SH0148

Hudson, R.J., D.M. Hebert and V.C. Brink. 1976.
Occupational patterns of wildlife on a major East Kootenay winter-spring range.
J. Range Manage. 29(1):38-43.

Investigates range vegetation and domestic livestock as being an important factors in the distributions and range use of deer, elk and bighorn sheep. Methods of observation were discussed. The study area was the Premier Ridge in southeastern British Columbia.
Subject: RA4 BE2 BE3 RT4 Area: A Source: CWSE

SH0151

Hudson, R.J., W.D. Kitts and V.C. Brink. 1972.
Habitat utilization by wildlife and livestock in the southern Rocky Mountain Trench, British Columbia.
Environment Canada.

Discusses habitat use by cattle, deer, elk and bighorn sheep in the southern Rocky Mountain trench in British Columbia. Range production and utilization, habitat, competition, nutrition, distributions, and some techniques for the study are included.
Subject: RA3 RA4 BE2 BE3 Area: A Source: CWSE

SH0153

Hunter, G.N. and R.G. Kinghorn. 1950.
Mountain sheep drive mule deer from food.
J. Mammal. 31(2):193.

Documents an incidence of bighorn sheep dominance over mule deer at a feeding area in northcentral Colorado.
Subject: RA4 Area: B Source: CWSE

SH0156

Jensen, C.H., A.D. Smith and G.W. Scotter. 1972.
Guidelines for grazing sheep on rangelands used by big game in winter.
J. Range Manage. 25(5):346-352.

Discusses forage competition between big game and domestic sheep in northern Utah on a big game winter range. Outlines possible management techniques to minimize this competition.
Subject: RA3 RA4 RA6 MA2 Area: B Source: CWSE

SH0175

Lauer, J.L. and J.M. Peek. 1976.
Big game - livestock relationships on the bighorn sheep winter range, east fork, Salmon River, Idaho.
Bureau of Land Management, United States Dept. of the Interior. Moscow, Idaho.

Detailed analysis of food habits, range vegetation and competition between bighorn sheep and livestock on the sheep winter range, east fork of Salmon River, Idaho.
Subject: RA4 BE3 NP2 Area: B Source: CWSE

SH0198

McCollough, S.A., A.Y. Cooperrider and J.A. Bailey. 1980.
Impact of cattle grazing on bighorn sheep habitat at Trickle Mountain, Colorado.
1980 North. Wild Sheep and Goat Conf., Salmon, Idaho. April 23-25, 1980: 42-59.

The range and food habits of bighorn sheep in Colorado are documented. The effect of cattle grazing on these ranges is analyzed with respect to forage competition.
Subject: RA4 RA5 BE2 BE3 Area: B Source: CWSE

SH0495

Morgan, J.K. 1969.
Rocky Mountain bighorn sheep investigations.
Idaho Fish and Game Job Completion Report for Job W-85-R-19, #2.

Discusses population, movements and migrations, competition with other species, and food habits for the Morgan Creek bighorn sheep herd, Idaho. Management methods for both sheep and range, and further study recommendations are given. Some growth rates and productivity figures are included.
Subject: BE2 NP2 RA4 Area: B Source: WNPL

SH0191

Morgantini, L.E. 1979.
Habitat selection and resource division among bighorn sheep, elk and mule deer in western Alberta.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Discusses the habitat, and the manner in which the species co-exist through division of habitat, of the Rocky Mountain bighorn sheep, elk and mule deer in the Red Deer River Valley, westcentral Alberta. Defines the operational components which had an effect on the animals and caused a physiological or behavioral response.
Subject: RA4 BE3 Area: B Source: UOAL CWSE

SH0473

Murie, O.J. 1951.
The elk of North America.
The Stackpole Co. Harrisburg, Pennsylvania.

A discussion of the competition between elk and bighorn sheep in North America is given in this book. The study area was Yellowstone National Park.
Subject: RA4 Area: B Source: ANNB

SH0208

Oldemeyer, J.L. 1966.
Winter ecology of bighorn sheep in Yellowstone National Park.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents results of a bighorn sheep study conducted on the northern winter range of Yellowstone National Park, Wyoming. Range condition and utilization, animal population numbers, and competition between elk and sheep are discussed.

Subject: RA2 RA3 RA4 BE3 Area: B Source: ANNB

SH0209

Oldemeyer, J.L., W.J. Barmore and D.L. Gilbert. 1971.
Winter ecology of bighorn sheep in Yellowstone National Park.
J. Wildl. Manage. 35(2):257-269.

Studies the range condition, vegetation, competition for food on the winter range, and the population and distribution of Rocky Mountain bighorn sheep in Yellowstone National Park.
Subject: RA4 BE2 BE3 NP2 Area: B Source: CWSE

SH0211

Packard, F.M. 1946.
An ecological study of the bighorn sheep in Rocky Mountain National Park, Colorado.
J. Mammal. 27(1):3-28.

A general study of Rocky Mountain bighorn sheep in Colorado. Topics discussed include habitat, population distribution, ranges and mortality factors. Also included is a study of reasons for the population decline.
Subject: RA1 RA4 PD1 MF1 Area: B Source: CWSE

SH0224

Pulling, A. Van S. 1945.
Porcupine damage to bighorn sheep.
J. Wildl. Manage. 9(4):329.

Documents damage to bighorn sheep in Nevada by porcupines.
Subject: RA4 Area: B Source: UABA UOAL

SH0396

Ratcliff, H.M. 1941.
Winter range condition in Rocky Mountain National Park.
Trans. North Amer. Wildl. Conf. 6:132-139.

Describes the winter range condition and usage by ungulates of the Horshoe Park area in Rocky Mountain National Park. Looks at the vegetation, competition among species and some population dynamics.
Subject: RA4 RA5 Area: B Source: ANNB AFWE

SH0389

Schallenberger, A.D. 1965.
Food habits, range use and interspecific relationships of bighorn sheep in the Sun River Area, west-central Montana.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

The purpose of the research was to get quantitative data on winter use of the range by bighorn sheep to aid in evaluation of range relationships among species. Outlines the seasonal food habits of sheep, and discusses competition with other species, in particular, elk.
Subject: NP2 RA4 RA5 Area: B Source: ANNB

SH0250

Shank, C.C. 1977.
Cooperative defense by bighorn sheep.
J. Mammal. 58(2):243.

Describes the behavior of bighorn sheep when defending against coyotes. Observation took place in Banff National Park on the Palliser Range.
Subject: RA4 MF3 Area: B Source: CWSE UOAL

SH0266

Spencer, C.C. 1943.
Notes on the life history of Rocky Mountain bighorn sheep in the Tarryall Mountains of Colorado.
J. Mammal. 24(1):1-11.

Gives general descriptions of species competition, lambing range, diseases, mortality due to predation and poaching, and reproduction of Rocky Mountain bighorn sheep in Colorado.
Subject: RA5 PD4 PD5 RA4 Area: B Source: CWSE

SH0476

Sperry, C.C. 1941.
Food habits of the coyote.
USDI Fish and Wildl. Serv. Wildl. Res. Bull. 4.

Looks at the relationship between bighorn sheep and coyotes.
Subject: RA4 MF3 Area: B Source: ANNB

SH0289

Stelfox, J.G. 1974.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
PhD. Thesis, Univ. of Montana. Missoula, Montana.

Detailed documentation of the range ecology of the Rocky Mountain bighorn sheep on six winter ranges in Jasper, Banff and Waterton National Parks. Population fluctuations, parasitism and some management techniques are discussed.
Subject: RA2 RA3 RA4 RA5 Area: B Source: CWSE

SH0280

Stelfox, J.G. 1969.
Ungulates as primary consumers.
Lecture presented at 8'th Annual Regional Park Warden 2 School, May 27, 1969 at Jasper National Park.

Discusses the relationships of wild ungulates to plant associations, and the effects of environmental carrying capacities, seasonal changes in forage nutrition and palatability, and climate on ungulates in the Canadian Rocky Mountains. Some general population distributions are included as well.
Subject: BE3 RA2 RA4 RA5 Area: A Source: CWSE

SH0290

Stelfox, J.G. 1974.
Range ecology of bighorn sheep in relation to self - regulation theories.
Can. Wildl. Serv. Edmonton, Alberta.

A study documenting population dynamics of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. When attempting to determine the reasons for fluctuating sheep populations, diseases, parasites and range conditions were studied.
Subject: DP1 RA2 RA4 RA6 Area: A Source: CWSE

SH0302

Stelfox, J.G. and D.J. Spalding. 1974.
Bighorn sheep ecology study, Vaseux - Bighorn Wildlife Area.
Can. Wildl. Serv. Edmonton, Alberta.

Documented population dynamics and range conditions in order to recommend range rejuvenation. The herds were made up of California bighorn sheep in the south Okanagan Valley.
Subject: RA2 RA4 RA6 MA2 Area: B Source: CWSE

SH0311

Szepanski, W. 1974.
An analysis of North American wild sheep populations.
Unpub. Research Report for St. Cloud College.

Discusses factors influencing population increases and decreases, estimations of these population numbers, and various research management programs of wild sheep in North America.
Subject: RA4 RA6 DP2 MA1 Area: B Source: AFWE

SH0312

Tanner, H.C. 1950.
Investigation into the competition between elk and big-horned sheep in the Cascade Valley, Banff National Park, 1950.
Can. Wildl. Serv. Edmonton, Alberta.

Documents the condition of the alpine meadows in the Cascade Valley, and discusses competition between elk and bighorn sheep in that area, with respect to range utilization.
Subject: RA2 RA4 BE3 Area: B Source: CWSE

SH0351

Woolf, A. 1968.
Summer ecology of bighorn sheep in Yellowstone National Park.
Unpub. MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Documents population size and distribution of bighorn sheep in Yellowstone National Park. The dominant plant and staple foods and potential elk competition is discussed.
Subject: BE2 NP2 RA4 Area: B Source: ANNB

CRITICAL AND SEASONAL RANGES (RA5)

SH0391

Allred, W.J. 1942.
A study of the Crystal Creek bighorn sheep range.
Wyoming Game and Fish Bull. 1:62-87, 95-121.

Range forage production was determined for three study different study periods. Chemistry of the range plants was studied. Outlined mineral deficiencies of the animals and how they compensated for this.
Subject: RA5 RA6 Area: B Source: ANNB

SH0392

Beath, O.A. 1942.
Biological significance of mineral licks. In Honess and Frost, Wyoming Game and Fish Bull. 1:88-94.

Studies the significance and chemical contents of mineral licks used by bighorn sheep on the Crystal Creek sheep range.
Subject: RA5 Area: B Source: ANNB

SH0393

Cowan, I. McT. and V.C. Brink. 1949.
Natural Game licks in the Rocky Mountain national parks of Canada.
J. Mammal. 30(4):379-387.

Lists the licks in the parks, and the animal usage of each. Describes mineral deficiencies in the animals, compensation for these, and various reasons for the use of the licks.
Subject: RA5 Area: A Source: ANNB UOAL

SH0478

Demarchi, R.A. 1968.
Chemical composition of bighorn winter forages.
J. Range Manage. 21(6):385-388.
Subject: RA5 RA6 BE3 Area: B Source: UOAL CWSE

SH0106

Geist, V. 1967.
Report on the investigations conducted into the behavior of bighorn sheep in Banff National Park in November and December, 1966.

Detailed account of the behavior, movements, and distributions of Rocky Mountain bighorn sheep in Banff National Park. There is some discussion regarding the tagging of sheep.
Subject: BE1 BE2 RA5 RT7 Area: B Source: CWSE

SH0111

Geist, V. 1972.
On the significance of thermoclines to the biology of wintering mountain sheep.
North. Wild Sheep Counc. Symp., Hinton, Alberta. April 11-13, 1972: 75-76.

Investigates the question of why mountain sheep frequent high elevations during mid-winter.
Subject: RA5 BE2 PD5 Area: A Source: KPNL

SH0494

Holsworth, W.N. 1957.
Report on the status of the Rocky Mountain bighorn sheep of Waterton Lakes National Park, Alberta and annotated list of the birds and mammals of Waterton Park.
Can. Wildl. Serv. Edmonton, Alberta.

The aims of the investigation were to trap and mark adult sheep so that they could be followed individually from their winter range on to their summer range, and to determine the time and place of lambing of the largest band of bighorn sheep in Waterton Lakes Park, the Pass Creek Band.
Subject: BE2 RA5 Area: B Source: WNPL

SH0483

Johnson, J.D. 1975.
An evaluation of the summer range of bighorn sheep (Ovis canadensis canadensis) on Ram Mountain, Alberta.
MSc. Thesis, Univ. of Calgary. Calgary, Alberta.
Subject: RA2 RA3 RA5 RA6 Area: B Source: CWSE

SH0164

Kerr, G.R. 1966.
Goat and sheep range distribution.
Alta. Dept. Lands and Forests Project W-1-65. Edmonton, Alberta.

The objectives of the survey were : (1) to determine current location and extent of Rocky Mountain goat and bighorn sheep ranges, (2) to classify ranges according to primary seasonal use and to delineate key areas, and (3) to map seasonal ranges. The survey included mountainous regions within the boundaries of either the Crowsnest or Bow River Forest Reserves. Details of vegetation, utilization and animal inhabitants are outlined for each numbered grazing allotment.
Subject: RA5 DP2 BE2 BE3 Area: B Source: AFWE

SH0419

Kindel, F. et al. 1970.
Idaho game populations census and range study.
F.A. Idaho Project No. W-85-R. Boise, Idaho.

Gives detailed account of populations, mortality due to hunting, diseases and parasites, range condition, migration, and other causes of mortality of bighorn sheep in Idaho.
Subject: PD1 BE2 RA5 MF1 Area: B Source: ANNB

SH0170

Lacy, C. 1971.
A case for the bighorn sheep.
Alta. Fish and Wildl. Hinton, Alberta.

Discusses deteriorating bighorn range conditions on the eastern slopes of the Rocky Mountains, Alberta, as being caused by man's activities - in particular, mining. Discusses various effects mining has on the land, and suggests some management procedures.
Subject: RA2 RA5 MA4 Area: B Source: AFWE

SH0198

McCollough, S.A., A.Y. Cooperrider and J.A. Bailey. 1980.
Impact of cattle grazing on bighorn sheep habitat at Trickle Mountain, Colorado.
1980 North. Wild Sheep and Goat Conf., Salmon, Idaho. April 23-25, 1980: 42-59.

The range and food habits of bighorn sheep in Colorado are documented. The effect of cattle grazing on these ranges is analyzed with respect to forage competition.
Subject: RA4 RA5 BE2 BE3 Area: B Source: CWSE

SH0199

McCrory, W.P. 1969.
Final report on study of natural licks used by mountain goats and bighorn sheep in Jasper National Park.
Can. Wildl. Serv. Edmonton, Alberta.

A study outlining the location and use of natural licks in Jasper National Park by bighorn sheep and mountain goats. The licks pertaining to the sheep are Shalebanks, Snake Indian Falls and the Desolation Pass licks. Included is a description of dye-marking for more accurate research.
Subject: RT5 RT7 RA5 Area: A Source: CWSE

SH0200

McLean. 1973.
Ram Mountain study.
Dept. Lands and Forests, Alta. Fish and Wildl. Div. Edmonton, Alberta.

Determines the limiting factors tending to stabilize the Ram Mountain sheep population. Documents trapping activities, mortality of marked sheep, inventory, general behavior, seasonal movements and distributions, and forage samples.
Subject: RA5 BE1 BE2 BE3 Area: B Source: AFWE

SH0215

Petocz, R.G. 1973.
The effect of snow cover on the social behavior of bighorn rams and mountain goats.
Can. J. Zool. 51:987-993.

Documents the effect of snow cover on the behavior of Rocky Mountain bighorn rams during the rutting season. The study was conducted on the Palliser Range, Banff National Park, Alberta.
Subject: RA5 PD5 BE1 Area: B Source: CWSE

SH0396

Ratcliff, H.M. 1941.
Winter range condition in Rocky Mountain National Park.
Trans. North Amer. Wildl. Conf. 6:132-139.

Describes the winter range condition and usage by ungulates of the Horshoe Park area in Rocky Mountain . National Park. Looks at the vegetation, competition among species and some population dynamics.
Subject: RA4 RA5 Area: B Source: ANNB AFWE

SH0389

Schallenberger, A.D. 1965.
Food habits, range use and interspecific relationships of bighorn sheep in the Sun River Area, west-central Montana.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

The purpose of the research was to get quantitative data on winter use of the range by bighorn sheep to aid in evaluation of range relationships among species. Outlines the seasonal food habits of sheep, and discusses competition with other species, in particular, elk.
Subject: NP2 RA4 RA5 Area: B Source: ANNB

SH0252

Shepherd, H.R. 1975.
Vegetation of two dissimilar bighorn sheep ranges in Colorado.
Colorado Div. Wildl., Project W-101-R.

Provides basic habitat and vegetational information useful in appraising results of food habits, nutrition and disease studies. Ecological descriptions of study areas, and details of the study methods are given. Detailed analysis of the habitat types for each of the winter, intermediate and lambing ranges are given for each area. Study areas are the Trickle Mountain and Buffalo Peaks Areas, Colorado.
Subject: RA5 RA6 BE3 NP2 Area: B Source: AFWE

SH0262

Smith, K. 1975.
Radio telemetry as a means of studying mortality of bighorn sheep lambs (Ovis canadensis canadensis).

Proposes the use of radio telemetry as a tool for measuring Rocky Mountain bighorn lamb mortality, as it allows daily observation and examination of young, and a rapid detection of natality, morbidity and mortality. This method is also useful in determining lambing ranges.
Subject: MF1 RA5 RT7 Area: C Source: AFWE

SH0266

Spencer, C.C. 1943.
Notes on the life history of Rocky Mountain bighorn sheep in the Tarryall Mountains of Colorado.
J. Mammal. 24(1):1-11.

Gives general descriptions of species competition, lambing range, diseases, mortality due to predation and poaching, and reproduction of Rocky Mountain bighorn sheep in Colorado.
Subject: RA5 PD4 PD5 RA4 Area: B Source: CWSE

SH0280

Stelfox, J.G. 1969.
Ungulates as primary consumers.
Lecture presented at 8'th Annual Regional Park Warden 2 School, May 27, 1969 at Jasper National Park.

Discusses the relationships of wild ungulates to plant associations, and the effects of environmental carrying capacities, seasonal changes in forage nutrition and palatability, and climate on ungulates in the Canadian Rocky Mountains.

Some general population distributions are included as well.
Subject: BE3 RA2 RA4 RA5 Area: A Source: CWSE

SH0289

Stelfox, J.G. 1974.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
PhD. Thesis, Univ. of Montana. Missoula, Montana.

Detailed documentation of the range ecology of the Rocky Mountain bighorn sheep on six winter ranges in Jasper, Banff and Waterton National Parks. Population fluctuations, parasitism and some management techniques are discussed.
Subject: RA2 RA3 RA4 RA5 Area: B Source: CWSE

SH0295

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep.
Ministery of Fisheries and the Environment, Can. Wildl. Serv. Edmonton, Alberta.
Can. Wildl. Report Series, No. 39.

Investigates range ecology in Jasper, Banff and Waterton National Parks. Documents production, utilization, vegetation, climate, and methods used. The summary relates range condition to population die-offs.
Subject: RA3 RA5 RA6 RT4 Area: B Source: CWSE KPWL

SH0298

Stelfox, J.G. and J. McGillis. 1977.
Ungulate surveys manual for prairie and western Canadian national parks.
Can. Wildl. Serv. Report to Parks Canada. Edmonton, Alberta.

Discusses various research techniques for determining populations, compositions, and distributions of ungulates in the prairie and western Canadian National Parks.
Subject: RT4 RT6 RA5 Area: B Source: KPWL

FLORAL PHENOLOGY AND CLIMATE (RA6)

SH0391

Allred, W.J. 1942.
A study of the Crystal Creek bighorn sheep range.
Wyoming Game and Fish Bull. 1:62-87, 95-121.

Range forage production was determined for three study different study periods. Chemistry of the range plants was studied. Outlined mineral deficiencies of the animals and how they compensated for this.
Subject: RA5 RA6 Area: B Source: ANNB

SH0006

Anonymous. 1970.
Kootenay National Park provisional master plan.
Queen's Printer for Canada. Ottawa, Canada.

Outlines Kootenay National Park's land use plans, park programs, natural resources, visitor use data and future studies and planning projects. It is a good reference for the history and general ecology of the park.
Subject: RA1 RA6 BE3 Area: A Source: AFWE

SH0037

Capp, J.C. 1967.
Competition among bighorn sheep, elk, and deer in Rocky Mountain National Park, Colorado.
MSc. Thesis, Colorado State Univ. Fort Collins, Colorado.

Discusses the vegetative composition and climate of the range, and the usage by various species of ungulates. The seasonal movements and distributions, occupancy of habitat types, and food preferences for each of sheep, elk and deer in Rocky Mountain National Park, Colorado, are given. Competition for range among these three ungulates is analyzed in terms of the above.
Subject: RA4 RA6 BE3 NP2 Area: B Source: CWSE

SH0061

Demarchi, D.A. 1967.
An ecological study of Rocky Mountain bighorn sheep winter ranges on the East Kootenay region of British Columbia.
Fish and Wildl. Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

Detailed study into the ecology of the East Kootenay region, using methods such as range composition, enclosures, productivity rating, animal distribution, soil and climatological stations. Documents various ecological factors of the following ranges: Bull River, Wigwam Flats, Premier Ridge, Columbia Lake and Stoddart Creek bighorn winter ranges. Management proposals for each region are included.
Subject: RA3 RA6 MA1 RT4 Area: A Source: BFWV CWSE

SH0478

Demarchi, R.A. 1968.
Chemical composition of bighorn winter forages.
J. Range Manage. 21(6):385-388.
Subject: RA5 RA6 BE3 Area: B Source: UOAL CWSE

SH0416

Demarchi, R.A. 1965.
An ecological study of the Ashnola bighorn winter ranges.
MSc. Thesis, Univ. of British Columbia. Vancouver, British Columbia.

Investigates the composition, floral phenology, productivity, utilization and soils of the Ashnola bighorn winter range. Includes discussion of the effects of overgrazing by bighorn and cattle.
Subject: RA2 RA3 RA6 NP2 Area: B Source: ANNB

SH0101

Gates, C.C. 1975.
Aspects of the environment - lungworm (Nematode:metastrongyloidea) - bighorn sheep (Ovis c. canadensis) system.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Discusses the role of nutrition and other environmental factors (especially climate) in lungworm infections in Rocky Mountain bighorn sheep. The study area was the Red Deer River valley, Alberta.
Subject: DP2 RA6 RT5 Area: B Source: UADZ

SH0124

Hebert, D.M. 1972.
Difference between years and nutrient cycles.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972: 15-20.

Relates growth of Rocky Mountain bighorn sheep to nutrition in diet and the climate of their ranges.
Subject: RA6 PD3 PD4 NP1 Area: A Source: KPNL

SH0150

Hudson, R.J., W.D. Kitts and P.J. Bandy 1971.
Immunoglobin response of the Rocky Mountain bighorn sheep.
J. Wildl. Diseases 7(2):171-174.

Documents the effects of individual variation, season nd parasite activity on the levels of the four major immunoglobins in Rocky Mountain bighorn ewes taken from the East Kootenay region of British Columbia. The methods used are outlined as well.
Subject: DP1 DP2 RA6 RT5 Area: A Source: UOAL

SH0155

Janz, B. and D. Storr. 1977.
The climate of the contiguous mountain parks Banff, Jasper, Yoho, Kootenay.
Atmospheric Environment Serv., Dept. of the Environment. Ottawa, Canada.

Gives a detailed description of weather and climate of the mountain national parks. Includes physiography, radiation, temperature, precipitation, wind, humidity, fire weather, vegetation, wildlife, and some research techniques.
Subject: RA6 RT4 Area: A Source: KPNL

SH0156

Jensen, C.H., A.D. Smith and G.W. Scotter. 1972.
Guidelines for grazing sheep on rangelands used by big game in winter.
J. Range Manage. 25(5):346-352.

Discusses forage competition between big game and domestic sheep in northern Utah on a big game winter range. Outlines possible management techniques to minimize this competition.
Subject: RA3 RA4 RA6 MA2 Area: B Source: CWSE

SH0483

Johnson, J.D. 1975.
An evaluation of the summer range of bighorn sheep (Ovis canadensis canadensis) on Ram Mountain, Alberta.
MSc. Thesis, Univ. of Calgary. Calgary, Alberta.
Subject: RA2 RA3 RA5 RA6 Area: B Source: CWSE

SH0158

Johnson, J.D. 1975.
An evaluation of bighorn sheep range on Ram Mountain, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Documents, in detail, the geography (climate and soil) and vegetation of 20 sample sites on the bighorn sheep range at Ram Mountain, Alberta. Also outlines the techniques and methods used.
Subject: RA6 RT4 BE3 Area: B Source: AFWE

SH0167

Krajina, V.J. 1959.
Bioclimatic zones in British Columbia.
The Univ. of British Columbia. Vancouver, British Columbia.

Gives a very detailed description of the climatic zones throughout British Columbia. A list of vegetation and soil type for each region is given as well.
Subject: RA3 RA6 Area: B Source: CWSE

SH0179

Loewen, A.B. 1971.
Bighorn sheep study, Disaster Point Range, Jasper National Park.
Can. Wildl. Serv. Edmonton, Alberta.

A detailed report documenting bighorn sheep herd movements and distributions each month. Included are climatic measurements taken over the years.
Subject: RA6 BE2 Area: B Source: CWSE

SH0408

Morgan, J.K. 1970.
Rocky Mountain bighorn sheep investigations.
Idaho Dept. Fish and Game. Boise, Idaho.
F.A. Idaho Project No. W-142-R.

Discusses range utilization and condition, and food preferences of Rocky Mountain bighorn sheep which had been transplanted in 1969 to Morgan Creek and the East Fork of the Salmon River, Idaho.
Subject: RT4 RA3 RA6 Area: B Source: ANNB

SH0486

Ogilvie, R.T. 1969.
The mountain forest and alpine zones of Alberta. In Vegetation, soils and wildlife : process and method in Canadian geography. Nelson, J.G. and M.J. Chambers (eds.). pp. 25-44.
Metheun Publ. Toronto.
Subject: RA2 RA3 RA6 Area: B Source: CWSE

SH0229

Riggs, R.A. and J.M. Peek. 1980.
Mountain sheep habitat-use patterns related to post-fire succession.
J. Wildl. Manage. 44(4):933-938.

Investigates the longterm effects of fire on the use of mountain sheep winter ranges in Glacier National Park. Includes the relationship of climate and vegetation to range use.
Subject: RA2 RA6 BE3 Area: B Source: CWSE

SH0242

Seel, K.E. 1965.
The flora of Kootenay National Park.
National and Historic Parks Branch. Calgary, Alberta.

Although not designed specifically for bighorn sheep ranges, the report documents in detail the flora of Kootenay National Park, and can be useful to anyone studying the sheep range vegetation.
Subject: RA6 Area: A Source: KPWL

SH0252

Shepherd, H.R. 1975.
Vegetation of two dissimilar bighorn sheep ranges in Colorado.
Colorado Div. Wildl., Project W-101-R.

Provides basic habitat and vegetational information useful in appraising results of food habits, nutrition and disease studies. Ecological descriptions of study areas, and details of the study methods are given. Detailed analysis of the habitat types for each of the winter, intermediate and lambing ranges are given for each area. Study areas are the Trickle Mountain and Buffalo Peaks Areas, Colorado.
Subject: RA5 RA6 BE3 NP2 Area: B Source: AFWE

SH0426

Simmons, N.M. 1962.
Daily and seasonal movements of Poudre River bighorn sheep.
Trans. Desert Bighorn Counc. 6:57-64.

Daily and seasonal movements of bighorn sheep of the Cache la Poudre , Colorado drainage were studied and related to weather changes, topographic and vegetative characteristics, the presence of other animal species, and the availability of food, minerals and water. Data was collected primarily during the spring and summer months of 1960.
Subject: BE2 RA6 Area: B Source: UOAL ANNB

SH0359

Smith, D.R. 1954.
Life history and ecology of the bighorn sheep in Idaho.
Unpub. MSc. Thesis, Univ. of Idaho. Moscow, Idaho.

Range, physical characteristics, vegetation, life history, and some management considerations for bighorn sheep in Idaho were discussed.
Subject: PD1 PD5 RA1 RA6 Area: B Source: ANNB

SH0285

Stelfox, J.G 1971.
Biotic - abiotic factors influencing forage palatability, preference and range carrying capacity.
Can. Wildl. Serv. Edmonton, Alberta.

Investigates various factors affecting forage palatability, preference, utilization and carrying capacity. Paper is divided between biotic and abiotic factors. The study area is not confined to any specific region, and various mammals are involved.
Subject: RA2 RA3 RA6 Area: C Source: CWSE

SH0295

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep.
Ministery of Fisheries and the Environment, Can. Wildl. Serv. Edmonton, Alberta.
Can. Wildl. Report Series, No. 39.

Investigates range ecology in Jasper, Banff and Waterton National Parks. Documents production, utilization, vegetation, climate, and methods used. The summary relates range condition to population die-offs.
Subject: RA3 RA5 RA6 RT4 Area: B Source: CWSE KPWL

SH0290

Stelfox, J.G. 1974.
Range ecology of bighorn sheep in relation to self - regulation theories.
Can. Wildl. Serv. Edmonton, Alberta.

A study documenting population dynamics of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. When attempting to determine the reasons for fluctuating sheep populations, diseases, parasites and range conditions were studied.
Subject: DP1 RA2 RA4 RA6 Area: A Source: CWSE

SH0277

Stelfox, J.G. 1967.
Bighorn artificial lick problem at Miette Hot Springs, Jasper National Park, May 27 and 28, 1967.
Can. Wildl. Serv. Edmonton, Alberta.

Discusses the relationship of artificial mineral licks to outbreaks of contagious ecthyma in bighorn sheep at Jasper National Park, Alberta.
Subject: DP1 RA6 Area: B Source: CWSE

SH0488

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep in Canadian national parks.
Can. Wildl. Serv. Rep. Series No. 39.
Subject: RA1 RA2 RA3 RA6 Area: A Source: CWSE

SH0302

Stelfox, J.G. and D.J. Spalding. 1974.
Bighorn sheep ecology study, Vaseux - Bighorn Wildlife Area.
Can. Wildl. Serv. Edmonton, Alberta.

Documented population dynamics and range conditions in order to recommend range rejuvenation. The herds were made up of California bighorn sheep in the south Okanagan Valley.
Subject: RA2 RA4 RA6 MA2 Area: B Source: CWSE

SH0311

Szepanski, W. 1974.
An analysis of North American wild sheep populations.
Unpub. Research Report for St. Cloud College.

Discusses factors influencing population increases and decreases, estimations of these population numbers, and various research management programs of wild sheep in North America.
Subject: RA4 RA6 DP2 MA1 Area: B Source: AFWE

SH0504

Thompson, R.W. and J.C. Turner. 1982.
Temporal geographic variation in the lambing season of bighorn sheep.
Can. J. Zool. 60: 1781-1793.

Paper assesses the variation in lambing seasons of 22 populations of bighorn sheep from Canadian national parks to western Texas. Lambing in northern populations is cued to a brief, relatively predictable period of plant growth while southern bighorn protract lambing such that some recruitment coincides with relatively unpredicatable plant growth, triggered by erratic rains.
Subject: PD4 PD5 RA6 Area: B Source: CWSE UOAL Bioenergetics (RT10)

SH0039

Chappel, R.W. 1976.
Bioenergetics of Rocky Mountain bighorn sheep.
The Univ. of Alberta. Edmonton, Alberta.

Outlines the theory and the bioenergetics of bighorn sheep, and how it shows a pattern of animal response to the environment. Discusses methodology and procedures in some detail. The study was carried out at the University of Alberta.
Subject: NP4 RT10 Area: A Source: CWSE

SH0040

Chappel, R.W. and R.J. Hudson. 1976.
Procedures and preliminary results on bioenergetics of bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:14-21.

This research was directed toward disclosing the energy budgets of Rocky Mountain bighorn sheep on an over-winter basis, utilizing the relationship between oxygen consumption, carbon dioxide production, and metabolic rate. In addition the study explored the effect of various stress factors such as cold, wind and fasting on energy expenditure and requirements.
Subject: RT10 NP4 Area: C Source: AFWE Food Habits

(RT11)

SH0135

Hoffmann, W.H. 1973.
Dall sheep rumen content analysis.
Can. Wild. Serv. Edmonton, Alberta.

Gives a detailed description of how rumen content analysis can be used to obtain dietary composition information.
Subject: NP2 RT11 Area: C Source: CWSE

SH0177

Laycock, W.A., H. Buchanan and W.C. Krueger. 1972.
Three methods of determining diet, utilization, and trampling damage on sheep ranges.
J. Range Manage. 25(5):352-356.

A report discussing and comparing three sampling methods (esophageal fistula, paired plot and ocular utilization estimates) to determine diet, utilization, and trampling damage on sheep ranges. Study was conducted in southwestern Montana.
Subject: RT4 RT11 RA3 Area: B Source: CWSE KPNL

SH0227

Rice, R.W., D.R. Cundy and P.R. Weyerts. 1970.
Botanical and chemical composition of esophageal and rumen fistula samples of sheep.
Journal Paper, Univ. of Wyoming. Laramie, Wyoming.

Outlines research techniques of bifistulated wethers (esophageal and rumen) to evaluate botanical and chemical composition. The study was done on domestic sheep in Laramie, Wyoming.
Subject: RT11 Area: C Source: CWSE

SH0318

Todd, J.W. and R.M. Hansen. 1973.
Plant fragments in the feces of bighorns as indicators of food habits.
J. Wildl. Manage. 37(3):363-366.

Discusses the utilization of fecal analysis to determine food habits of bighorn sheep in Colorado.
Subject: NP2 RT11 Area: B Source: CWSE Forage Analysis (RT12)

SH0160

Johnston, A., L.M. Bezeau and S. Smoliak. 1968.
Chemical composition and in vitro digestibility of alpine tundra plants.
J. Wildl. Manage. 32(4):773-777.

Documents the chemical composition and in vitro digestibility of various plant species of the alpine tundra. The study area was a Rocky Mountain bighorn sheep summer range in southwestern Alberta.
Subject: NP2 RT12 Area: B Source: UOAL

SH0168

Krueger, W.C. 1972.
Evaluating animal forage preference.
J. Range Manage. 25(6):471-475.

Describes in detail the methods used for and results of determining sheep forage preferences on a summer range in southwestern Montana.
Subject: NP2 RT4 RT12 Area: B Source: CWSE

RESEARCH TECHNIQUES (RT1)

STATISTICAL METHODS (RT3)

SH0502

Hudson, R.J. 1977.
Habitat utilization and resource partitioning by wild ruminants : multivariate analysis of nominally-sealed attribute data.
Northwest Science 51(2):101-110.

"Multivariate nominal scale analysis, a relatively new statistical technique, was applied to the study of habitat use and resource partitioning in a western Canada native grazing system comprised of whitetailed deer, mule deer, wapiti and bighorn sheep." The study area was Premier Ridge, B.C.
Subject: RT3 Area: A Source: LARS

RANGE ANALYSIS (RT4)

SH0043

Constan, K.J. 1967.
Bighorn sheep range use, food habits and relationships to mule deer and elk in Gallatin Canyon.
Montana Fish and Game Dept.

Detailed description of range use, food habits and interspecific relationships of bighorn sheep, mule deer and elk. Some research techniques were also included.
Subject: RA4 BE3 NP2 RT4 Area: B Source: CWSE

SH0049

Cooperrider, A.Y., S.A. McCollough and J.A. Bailey. 1980.
Variation in bighorn sheep food habits as measured by fecal analysis.
The 1980 North. Wild Sheep and Goat Conf., Salmon, Idaho. April 23-25, 1980:29-41.

Discusses the technique of using fecal analysis to determine food habits of bighorn sheep.

Subject: NP2 RT4 Area: C Source: CWSE

SH0058

Dale, A.R. and J.A. Bailey. 1982.
Application of optimal foraging theory for bighorn sheep habitat evaluation.
Third Biennial Symp. of the North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:254-261.

Describes a method for measuring forage efficiency of bighorn sheep in Waterton Canyon, Colorado. The method uses the optimal foraging theory and relates it to the distribution and sizes of potential bites, and availability for efficient harvest by bighorns.
Subject: RA2 BE3 NP2 RT4 Area: B Source: AFWE

SH0060

Demarchi, D.A. 1966.
Productivity of the Stoddart Creek winter range.
Fish and Wildlife Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

This report outlines the methods and techniques used to estimate productivity of the bighorn sheep winter range at Stoddart Creek in southeastern British Columbia. Forage sample descriptions are compiled for each site.
Subject: RA1 RT4 BE3 Area: A Source: KPNL

SH0061

Demarchi, D.A. 1967.
An ecological study of Rocky Mountain bighorn sheep winter ranges on the East Kootenay region of British Columbia.
Fish and Wildl. Branch, Dept. of Recreation and Conservation. Victoria, British Columbia.

Detailed study into the ecology of the East Kootenay region, using methods such as range composition, enclosures, productivity rating, animal distribution, soil and climatological stations. Documents various ecological factors of the following ranges: Bull River, Wigwam Flats, Premier Ridge, Columbia Lake and Stoddart Creek bighorn winter ranges. Management proposals for each region are included.
Subject: RA3 RA6 MA1 RT4 Area: A Source: BFWV CWSE

SH0062

Demarchi, D.A. 1971.
Ecology of big game winter ranges in the southern Rocky Mountain Trench, East Kootenay region.
B.C. Fish and Wildlife Branch. Victoria, British Columbia.

Describes in detail the condition, utilization, quality and floral phenology of the big game winter ranges in the East Kootenay region of B.C. Includes a discussion of the effects of the flooding of the Libby Reservoir and possible livestock reductions in that area.
Subject: RA2 RA3 RA4 RT4 Area: A Source: CWSE

SH0063

Demarchi, D.A. 1971.
An outline of a quantitative ecology technique employing a macroplot with sub-sampling procedures.
B.C. Fish and Wildlife, Ministry of the Environment. Victoria, British Columbia.

Detailed description of the method of employing a macroplot with sub-sampling procedures in measuring the productivity of a bighorn sheep winter range. Included are descriptions of the macroplot design of Poulton and Tisdale (1961) and the canopy coverage technique of plot analysis by Daubenmire (1959, 1968).
Subject: RT4 BE3 Area: A Source: BFWV CWSE

SH0112

Geist, V. 1972.
On the management of large mammals in national parks - part I.
National and Provincial Parks Assoc. of Can. Toronto, Ontario.
Park News. July 1972:8-14.

Discusses planning for, and management of large mammals in National parks. Various research methods are studied as well.
Subject: MA1 RT4 RT6 Area: C Source: CWSE

SH0118

Grunigen, R.E. 1980.
A system for evaluating potential bighorn sheep transplant sites in northern New Mexico.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:211-228.

Evaluates six ranges in New Mexico by assessing important habitat parameters, to determine suitability for bighorn sheep transplants. Discusses applications and limitations of this habitat evaluation system in range suitability, and in developing management strategies for the sheep.
Subject: RT4 MA1 BE3 Area: C Source: AFWE

SH0128

Hebert, D.M. 1976.
Intensive sheep production product, Okanagan Game Farm (preliminary outline).
B.C. Fish and Wildl. Branch. Nanaimo, British Columbia.

Contains various papers dealing with bighorn sheep production on the Okanagan Game Farm, British Columbia. Outlines the research program to be conducted on the farm, and includes various techniques and theoretical considerations.
Subject: PD3 MA1 BE1 RT4 Area: B Source: CWSE

SH0148

Hudson, R.J., D.M. Hebert and V.C. Brink. 1976.
Occupational patterns of wildlife on a major East Kootenay winter-spring range.
J. Range Manage. 29(1):38-43.

Investigates range vegetation and domestic livestock as being an important factors in the distributions and range use of deer, elk and bighorn sheep. Methods of observation were discussed. The study area was the Premier Ridge in southeastern British Columbia.

Subject: RA4 BE2 BE3 RT4 Area: A Source: CWSE

SH0155

Janz, B. and D. Storr. 1977.
The climate of the contiguous mountain parks Banff, Jasper, Yoho, Kootenay.
Atmospheric Environment Serv., Dept. of the Environment. Ottawa, Canada.

Gives a detailed description of weather and climate of the mountain national parks. Includes physiography, radiation, temperature, precipitation, wind, humidity, fire weather, vegetation, wildlife, and some research techniques.
Subject: RA6 RT4 Area: A Source: KPNL

SH0158

Johnson, J.D. 1975.
An evaluation of bighorn sheep range on Ram Mountain, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Documents, in detail, the geography (climate and soil) and vegetation of 20 sample sites on the bighorn sheep range at Ram Mountain, Alberta. Also outlines the techniques and methods used.
Subject: RA6 RT4 BE3 Area: B Source: AFWE

SH0168

Krueger, W.C. 1972.
Evaluating animal forage preference.
J. Range Manage. 25(6):471-475.

Describes in detail the methods used for and results of determining sheep forage preferences on a summer range in southwestern Montana.
Subject: NP2 RT4 RT12 Area: B Source: CWSE

SH0177

Laycock, W.A., H. Buchanan and W.C. Krueger. 1972.
Three methods of determining diet, utilization, and trampling damage on sheep ranges.
J. Range Manage. 25(5):352-356.

A report discussing and comparing three sampling methods (esophageal fistula, paired plot and ocular utilization estimates) to determine diet, utilization, and trampling damage on sheep ranges. Study was conducted in southwestern Montana.
Subject: RT4 RT11 RA3 Area: B Source: CWSE KPNL

SH0186

Matthews, J.W. 1973.
Ecology of bighorn sheep on Wildhorse Island, Flathead Lake, Montana.
M.S. Thesis, Univ. of Montana. Missoula, Montana.

A study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. Mortality factors and methodologies for the study are outlined in detail.
Subject: RT4 BE2 BE3 MF1 Area: B Source: CWSE

SH0408

Morgan, J.K. 1970.
Rocky Mountain bighorn sheep investigations.
Idaho Dept. Fish and Game. Boise, Idaho.
F.A. Idaho Project No. W-142-R.

Discusses range utilization and condition, and food preferences of Rocky Mountain bighorn sheep which had been transplanted in 1969 to Morgan Creek and the East Fork of the Salmon River, Idaho.
Subject: RT4 RA3 RA6 Area: B Source: ANNB

SH0232

Rominger, E.M. and J.A. Bailey. 1982.
Forage preference indices : adjusting forage availability data for habitat selection.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:278-286.
Subject: BE3 NP2 RT4 Area: B Source: AFWE

SH0293

Stelfox, J.G. 1976.
Determination of ungulate carrying capacities in national parks.
Can. Wildl. Serv. Edmonton, Alberta.
Palisades Training School, March 1 and 2, 1976. Ungulate Management.

Discusses the methods by which one can determine the range carrying capacity of ungulates in national parks. The carrying capacity is considered from a grazing capacity standpoint with respect to possible management objectives.
Subject: RA3 RT4 MA2 Area: C Source: CWSE

SH0295

Stelfox, J.G. 1976.
Range ecology of Rocky Mountain bighorn sheep.
Ministery of Fisheries and the Environment, Can. Wildl. Serv. Edmonton, Alberta.
Can. Wildl. Report Series, No. 39.

Investigates range ecology in Jasper, Banff and Waterton National Parks. Documents production, utilization, vegetation, climate, and methods used. The summary relates range condition to population die-offs.
Subject: RA3 RA5 RA6 RT4 Area: B Source: CWSE KPWL

SH0291

Stelfox, J.G. 1974.
Wildlife and wildlife habitat : census inventory.
Can. Wildl. Serv. Edmonton, Alberta.

Outlines objectives and methods of surveying wildlife in North America. Discusses types of ground and aerial census techniques. Some management suggestions with respect to conservation and preservation are gives.
Subject: MA1 RT4 RT6 Area: C Source: CWSE

SH0297

Stelfox, J.G. and J. McGillis. 1970.
Seasonal growth patterns of bighorns correlated with range conditions and endoparasite loads.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970:35-38.

Paper outlines the direct correlation between forage production, ungulate stocking rates, endoparasite loads and overwinter weight losses. The data was obtained from Jasper, Banff, Waterton and Kootenay National Parks.
Subject: DP1 RT4 PD4 Area: A Source: CWSE

SH0298

Stelfox, J.G. and J. McGillis. 1977.
Ungulate surveys manual for prairie and western Canadian national parks.
Can. Wildl. Serv. Report to Parks Canada. Edmonton, Alberta.

Discusses various research techniques for determining populations, compositions, and distributions of ungulates in the prairie and western Canadian National Parks.
Subject: RT4 RT6 RA5 Area: B Source: KPWL

DISEASE AND PARASITES (RT5)

SH0003

Allen, R.W. 1961.
Methods of examining bighorn sheep for parasites.
Fifth Annual Meeting, Desert Bighorn Counc., Sonora, Mexico. April 4-7, 1961:75-79.

Detailed discussion of the observation and collection of sheep specimens in the field, and the examination of specimens, diagnosis of the condition, and identification of parasites.
Subject: RT5 RT9 Area: C Source: UOAL

SH0008

Anonymous. 1970.
Pneumonia in Rocky Mountain bighorn sheep.
Progress Report for the Rachelwood Wildlife Preserve. New Florence, Pennsylvania.

Outlines an investigation into two types of pneumonia in bighorn sheep at the Rachelwood Wildlife Preserve and Colorado State Univ. Some techniques are discussed. The two pneumonia types studied are: Protostrongylus stilesi and Pasteurella.
Subject: DP2 RT5 Area: B Source: CWSE

SH0029

Boag, D.A. and W.D. Wishart. 1982.
Distribution and abundance of terrestrial gastropods on a winter range of bighorn sheep in southwestern Alberta.
Can. J. Zool. 60:2633-2640.

Documents distribution and abundance of terrestrial gastropods on the winter ranges of bighorn sheep at the Sheep River drainage, Alberta. Some research techniques are included. The results are discussed in relation to transmission of lungworm.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0042

Choquette, L.P.E. and E. Broughton. 1966.
Bighorn sheep investigation.
Can. Wildl. Service. Edmonton, Alberta.

A detailed investigation into the diseases and parasites affecting bighorn sheep in Kootenay National Park. Includes specific case histories of specimens examined in the park.
Subject: DP1 RT5 RT8 Area: A Source: CWSE

SH0047

Cooley, T.M. 1976.
Lungworms in mountain goats.
MSc. Thesis, Colorado State Univ. PP = Fort Collins, Colorado.

Discusses lungworm infection in mountain goats as well as in bighorn sheep. Gives detailed biology of the lifecycle of lungworms, including pathogenesis and pathology. Techniques are discussed in detail.
Subject: DP2 RT5 Area: B Source: UADZ

SH0493

Cowan, I.McT. 1944.
Parasites, diseases and injuries of game animals in Banff, Jasper and Kootenay National Parks.
National Parks Bureau. Ottawa, Canada.

Documents incidence of parasites, diseases and injuries of game animals in Banff, Jasper and Kootenay National Parks during 1944.
Subject: DP1 DP2 RT5 Area: A Source: WNPL

SH0056

Crofton, H.D. 1963.
Nematode parasite population in sheep and on pasture.
The Commonwealth Agricultural Bureaux. Farnham Royal. Bucks, England.

Documents life histories and populations of various parasites known to affect sheep. Includes a consideration of control measures and the effect of climatic conditions on the pre-parasitic stages.
Subject: DP1 RT5 Area: C Source: CWSE

SH0070

DeMartini, J.C. and R.B. Davies. 1977.
An epizootic of pneumonia in captive bighorn sheep infected with Muellerius sp.
J. Wildl. Diseases 13(2):117-124.

Documents incidence of disease (Muellerius spp. in particular) in captive Rocky Mountain bighorn sheep in Colorado. Results are obtained through a series of isolations of viruses and bacteria.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0084

Foreyt, B. and R. Johnson. 1980.
Treatment for lungworms (Protostrongylus spp.) in Rocky Mountain bighorn sheep.
Proc. of the Biennial Symp. of the North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:248-261.

Discusses the results of albendazole treatment of Rocky Mountain bighorn sheep with lungworms (Protostrongylus spp.). Methods are discussed in detail. The sheep were taken from Wildhorse Island, Montana.
Subject: DP2 RT5 Area: B Source: AFWE

SH0086

Forrester, D.J. 1962.
Land mollusca as possible intermediate hosts of Protostrongylus stilesi, a lungworm of bighorn sheep.
Proc. Montana Acad. of Sciences 22:82-92.

Documents the capability of land mollusca to serve as intermediate hosts of Protostrongylus stilesi. The study was conducted in western Montana.
Subject: DP2 RT5 Area: B Source: CWSE

SH0381

Forrester, D.J. and E. Wada. 1967.
An attempt to isolate viruses from lung tissue and lung nematodes of bighorn sheep.
J. Wildl. Dis. Assoc. 3:74-77.

This study was done to try to isolate PI-3 viruses and/or other respiratory viruses from lungs of bighorn sheep. Describes the research methods in detail, and makes suggestions for further studies.
Subject: DP1 RT5 Area: B Source: ANNB

SH0092

Forrester, D.J. and C.M. Senger. 1964.
A survey of lungworm infection in bighorn sheep of Montana.
J. Wildl. Manage. 28(3):481-491.

Study documents the investigation of lungworm as a cause of the declining numbers of the Rocky Mountain bighorn sheep in Montana. Methods of fecal and lung analysis are described.
Subject: DP2 RT5 Area: B Source: CWSE

SH0101

Gates, C.C. 1975.
Aspects of the environment - lungworm (Nematode:metastrongyloidea) - bighorn sheep (Ovis c. canadensis) system.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Discusses the role of nutrition and other environmental factors (especially climate) in lungworm infections in Rocky Mountain bighorn sheep. The study area was the Red Deer River valley, Alberta.
Subject: DP2 RA6 RT5 Area: B Source: UADZ

SH0458

Hall, M.C. 1931.
Parasite control in wild animals..
Outdoor America July:16-17, 46.

Covers various specific problems of parasites in wild animals, including the lungworms of bighorn sheep. Some reasons were outlined as contributing to the susceptibility of the sheep to this disease.
Subject: DP2 MA3 RT5 Area: B Source: ANNB

SH0459

Hamdy, A. and V. Songer. 1959.
Characteristics of a virus associated with lamb pneumonia.
Amer. J. Vet. Res. 20:84-86.

This investigation was designed to obtain additional information on the virus agent isolated from pneumonic domestic lambs. The virus was isolated and propogated in tissue cultures, then tested in various animals. A list of references was also given.
Subject: DP2 RT5 Area: B Source: ANNB

SH0137

Holmes, J.C. and W.M. Samuel. 1974.
Surveillance study of the parasites of bighorn sheep in the mountain national parks.
Dept. of Zoology, The Univ. of Alberta. Edmonton, Alberta.

Studies the relation between infection of parasites in bighorn sheep and the history of population die-offs. Documents sampling and evaluation of health of individual herds from Jasper, Kootenay and Waterton National Parks. Some techniques are discussed.
Subject: DP2 RT5 PD2 Area: A Source: KPWL KPNL

SH0136

Holmes, J.C., J.L. Mahrt and W.M. Samuel. 1973.
Proposal for a surveillance study to monitor the lungworms and gastro-intestinal parasites of bighorn sheep in the mountain national parks, 1972 and 1973.
Dept. of Zoology, The Univ. of Alberta. Edmonton, Alberta.

Outlines techniques used to monitor the lungworms and parasite burdens of bighorn sheep in Jasper, Kootenay, Waterton and Banff National Parks. Includes a plan of sampling schedule and procedures, and describes laboratory analysis.
Subject: RT5 DP2 Area: A Source: KPWL

SH0385

Hudson, R.J. 1970.
Monitoring disease in the Rocky Mountain bighorn.
Trans. North. Wild Sheep Counc. p. 22. (abstract)

Discusses the usefullness of employing seromucoid analysis in trapping procedures for studying host response to parasitism.
Subject: RT5 Area: B Source: ANNB UOAL

SH0144

Hudson, R.J. 1970.
Immunology of lungworm (Protostrongylus) infections of the Rocky Mountain bighorn sheep.
MSc. Thesis, The Univ. of B.C. Vancouver, British Columbia.

Discusses in detail the immunology of lungworm infections of the Rocky Mountain bighorn sheep in British Columbia. Descriptions of each type of experiment (procedures and results) were outlined.
Subject: DP1 DP2 RT5 Area: A Source: CWSE UBCL

SH0150

Hudson, R.J., W.D. Kitts and P.J. Bandy 1971.
Immunoglobin response of the Rocky Mountain bighorn sheep.
J. Wildl. Diseases 7(2):171-174.

Documents the effects of individual variation, season nd parasite activity on the levels of the four major immunoglobins in Rocky Mountain bighorn ewes taken from the East Kootenay region of British Columbia. The methods used are outlined as well.
Subject: DP1 DP2 RA6 RT5 Area: A Source: UOAL

SH0149

Hudson, R.J., W.D. Kitts and P.J. Bandy. 1970.
Monitoring parasite activity and disease in the Rocky Mountain bighorn by electrophoresis of seromucoids.
J. Wildl. Diseases 6:104-106.

Documents the measurement of host-parasite interaction between Rocky Mountain bighorn sheep and the lungworm parasite Protostrongylus stilesi. The method used is electrophoresis of seromucoids.
Subject: DP2 RT5 RT9 Area: A Source: CWSE

SH0154

Hunter, G.N. and R.E. Pillmore. 1954.
Hunting as a technique in studying lungworm infestations in bighorn sheep.
Trans. Nineteenth North Amer. Wildl. Conf. March 8-10, 1954:116-131.

Investigates the possibility of using hunting as a technique in studying lungworm in Rocky Mountain bighorn sheep. Documents a study done using this method.
Subject: DP2 RT5 MF4 Area: B Source: CWSE

SH0274

J.G., Stelfox. 1966.
Detailed data on diseased bighorns immobilized, treated and necropsied from the Radium Hot Springs and Jasper herds, Sept. 25 - Nov. 15, 1966.
Can. Wildl. Serv. Edmonton, Alberta.

Documents treatments of diseased bighorn sheep from the Radium Hot Springs and Jasper herds. Condition and health of the animals is described.
Subject: DP1 DP2 PD3 RT5 Area: A Source: CWSE

SH0157

Johnson, R.L. 1973.
Bighorn sheep 1973 - a biological evaluation of the Tucannon bighorn with notes on other Washington sheep.
Washington Dept. of Game.

Study investigates die-offs in the Tucannon bighorn sheep through biological investigation. Gives details of biological examinations with respect to diseases and parasites.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0171

Lance, W.R 1980.
Contagious ecthyma in Rocky Mountain bighorn sheep.
Thesis, Colorado State Univ. Fort Collins, Colorado.

Investigates the epizootiology, morphologic pathology and host range of the contagious ecthyma virus obtained from Rocky Mountain bighorn sheep of the Sagauche herd, south Colorado. Research techniques are discussed in some detail.
Subject: DP1 RT5 Area: B Source: UADZ

SH0173

Lange, R.E. Jr. 1973.
Epidemiology of lungworms (Protostrongylus stilesi and rushi) in Rocky Mountain bighorn sheep (Ovis c. canadensis).
Thesis, Colorado State Univ. Fort Collins, Colorado.

Investigates the completion and epidemiology of the lungworm life cycle. Methodology is discussed quite extensively. Study was conducted on Rocky Mountain bighorn sheep near Meeker, Colorado.
Subject: DP2 RT5 Area: B Source: UADZ

SH0174

Latson, F.E. III. 1977.
The distribution and ecology of intermediate host snails of Protostrongylus spp. lungworms of bighorn sheep on Pike's Peak, Colorado.
Thesis, Colorado State Univ. Fort Collins, Colorado.

Studies the distribution of snails suitable as intermediate hosts for Protostrongylus spp. lungworm of bighorn sheep, Ovis canadensis. The ecology of the host snails and the life cycle of the parasite is also discussed. The study area is Pike's Peak, Colorado.
Subject: DP2 RT5 Area: B Source: UADZ

SH0181

MacCracken, J.G. 1980.
Intraspecific changes in fecal pH.
J. Wildl. Manage. 44(3):752-756.

Discusses changes in pH levels of fecal samples of deer, elk, goats and mountain sheep. Stated that changes can take place for various reasons, Varying methods of analysis also contribute to the changes, including different ways of drying the samples.
Subject: RT5 RT6 Area: C Source: CWSE

SH0199

McCrory, W.P. 1969.
Final report on study of natural licks used by mountain goats and bighorn sheep in Jasper National Park.
Can. Wildl. Serv. Edmonton, Alberta.

A study outlining the location and use of natural licks in Jasper National Park by bighorn sheep and mountain goats. The licks pertaining to the sheep are Shalebanks, Snake Indian Falls and the Desolation Pass licks. Included is a description of dye-marking for more accurate research.
Subject: RT5 RT7 RA5 Area: A Source: CWSE

SH0190

Monson, R.A. and G. Post. 1972.
Experimental transmission of Protostrongylus stilesi to bighorn-mouflon sheep hybrids.
J. Parasit. 58(1):29-33.

Investigates the life cycle of Protostrongylus stilesi by transmission of the infective larvae from the intermediate host to the definitive host. Definitive hosts were mouflon-bighorn sheep hybrids (Ovis musimon, Ovis c. canadensis). Techniques used are described in detail.
Subject: DP2 RT5 Area: C Source: UOAL

SH0192

Morton, J.K. and N. Kingston. 1976.
Further studies on Trypanosomes in game animals in Wyoming.
J. Wildl. Diseases 12(2):233-236.

Discusses Trypanosoma sp. infections in game animals (elk, deer, pronghorn and bighorn sheep) in Wyoming. Blood samples for the analysis were taken from captive ungulates in that area.
Subject: DP1 RT5 Area: B Source: UOAL

SH0212

Nash, P., G. Post and A. Woolf. 1972.
Preparation and testing of Pasteurella bacterins on captive bighorn sheep.
North. Wild Sheep Counc. Symp. Proc., Hinton, Alberta. April 11-13, 1972: 34-43.

Outlines the techniques used for, and outcomes of testing Rocky Mountain bighorn sheep for Pasteurella bacterins. The study area was Colorado.
Subject: DP1 RT5 Area: B Source: KPNL

SH0202

Parks, J.B. and J.J. England. 1974.
A serological survey for selected viral infections of Rocky Mountain bighorn sheep.
J. Wildl. Diseases 10(2):107-110.

Study determines viral infections common to Rocky Mountain bighorn sheep in Colorado and Wyoming. The method used was a detection of viral antibodies through serum collection and serological tests.
Subject: DP1 RT5 Area: B Source: UOAL

SH0203

Pearson, N.J. and J.J. England. 1979.
Isolation of a Chlamydial agent from Rocky Mountain bighorn sheep.
J. Wildl. Diseases 15(4):499-503.

Documents isolation of a chlamydial agent from bighorn sheep in Colorado. Techniques used are discussed in some detail. Includes the possible relation of the isolate to the pneumonia complex in these animals.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0219

Pillmore, R.E. 1958.
Investigations of disease and parasites affecting game animals. Study of the lung nematodes of game animals.
The State of Colorado Fish and Wildl. Serv.

Study outlines two research techniques : fecal analysis and snail culture. Also discusses the role of climate in snail infections. Different game animal infections in animals found in Colorado are studied.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0218

Pillmore, R.E. 1961.
Investigations of disease and parasites affecting game animals.
Project W-95-R, The State of Colorado Fish and Wildl. Serv. Denver, Colorado.

Studies the lung nematodes of game animals in particular, and includes an investigation of general diseases and parasites affecting these animals. Some techniques were discussed. The study was conducted at the Denver Federal Center and Wildlife Research Laboratories in Colorado.
Subject: DP1 DP2 RT5 Area: B Source: CWSE

SH0226

Reid, K.W. 1969.
The ecology of certain terrestrial snails and their relationship to the lungworm of bighorn sheep.
MSc. Thesis, Univ. of B.C. Vancouver, British Columbia.

Investigates the ecology of snails which are intermediate hosts of Protostrongylus stilesi, a parasite of Rocky Mountain bighorn sheep. Discusses the effects of climatic and edaphic factors on the snails. Their relationship to the lungworm of bighorn sheep is included. The study area is the East Kootenays of British Columbia.
Subject: DP2 RT5 Area: A Source: UADZ

SH0235

Samuel, W.M. and 1982.
Evaluation of the Baermann technic for recovery of lungworm (Nematode, Protostrongylidae) larvae from wild ruminants.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:232-243.

Investigates the Baermann Technic for recovering lungworm larvae from wild ruminants, specifically mule deer and bighorn sheep. Sheep fecal samples were taken from Banff and Kootenay National Parks as well as Wyoming.
Subject: RT5 Area: A Source: UADZ

SH0234

Samuel, W.M. et al. 1975.
Contagious ecthyma in bighorn sheep and mountain goats of western Canada.
J. Wildl. Diseases 11:26-31.

Detailed outline concerning contagious ecthyma in bighorn sheep and goat in western Canada. Some methodology is included in the report.
Subject: DP1 RT5 Area: A Source: CWSE KPWL

SH0236

Samuel, W.M., W.K. Hall J.G. Stelfox and W.D. Wishart. 1977.
Parasites of mountain goat, Oreamnos americanus (Blainville), of westcentral Alberta with a comparison of helminths of mountain goat and Rocky Mountain bighorn sheep, Ovis c. canadensis Shaw.
Proc. First International Mountain Goat Symp., Kalispell, Montana. Feb. 19, 1977:212-225.

Compares the prevalence and number of parasites in mountain goat to those in Rocky Mountain bighorn sheep. Sheep were taken from various locations throughout Alberta.
Subject: DP1 DP2 RT5 Area: B Source: UADZ

SH0243

Senger, C.M. and D.J. Forrester. 1960.
Survival of nematodirid larvae at high temperatures.
J. Parasit. 48(2):50.

Explains how a nematodirid larvae survives when subjected to high temperatures.
Subject: RT5 Area: C Source: CWSE

SH0244

Senger, C.M. and D.J. Forrester. 1960.
Experimental infestation of a Rocky Mountain bighorn lamb with Melophagus ovinus (Diptera:Hippoboscidae).
J. Parasit. 46(5):598.

The essay outlines the infection of a bighorn lamb with Melophagus ovinus a parasite of domestic sheep. Because the experiment was successful, management considerations suggested limited contact with domestic sheep.
Subject: DP1 MA1 RT5 Area: C Source: CWSE

SH0245

Senger, C.M. and R.L. Ruff. 1960.
Survival and development of nematodirid ova in pellets under drying conditions and freezing conditions.
J. Parasit. 48(2):50.

Explains how eggs of Nematodirus spathiger survived and developed under both drying and freezing conditions.
Subject: RT5 Area: C Source: CWSE UOAL

SH0465

Shirlaw, J.F. 1959.
The pneumonia of the sheep with special reference to enzootic pneumonia and Jaagsietke.
Vet. Rev. and Annot. 5(1):37-57.

A complete review of various pneumonic diseases in sheep, with a list of references for both bighorn and domestic sheep. The pathology of the diseases was outlined as well.
Subject: DP2 RT5 Area: B Source: ANNB

SH0466

Stamp, J., J. Watt and J. Thomlinson. 1955.
Pasteurella Hemolytica Septicemia of lambs.
J. Comp. Path. 65:183-196

The authors gave a short review on pneumonia outbreaks in sheep. Complete post-mortem clinical signs and histological findings were given as well as bacteriological examinations....Pathogenicity tests were run using fresh cultures from lungs, plate cultures and serum broths....Photographs were given of pathology and organisms in the lung and liver.
Subject: DP2 RT5 RT9 Area: B Source: ANNB

SH0278

Stelfox, J.G. 1967.
Transactions of the first northern wild sheep conference, May 1-9, 1967.
Can. Wildl.Serv. Edmonton, Alberta.

Outlines the proceedings of the wild sheep conference. Topics discussed are population fluctuations, and techniques used in research. The study area is the Rocky Mountains of Alberta and British Columbia. Included are extensive literature reviews - on mountain sheep in general, as well as one on the techniques of field immobilization of animals.
Subject: BW PD2 DP2 RT5 Area: A Source: CWSE

SH0276

Stelfox, J.G. 1967.
Transactions of first northern wild sheep field study, May 1-9, 1967.
Can. Wildl. Serv. Report to Parks Canada.

Outlines the daily proceedings of the study. Documents various techniques used, as well as the general conditions of the herds. The study was conducted in Kootenay, Banff and Jasper National Parks.
Subject: PD1 BW RT5 RT6 Area: A Source: KPWL

SH0294

Stelfox, J.G. 1976.
Diseases and parasites of bighorn sheep in Canadian national parks, 1966 to 1972.
Can. Wildl. Serv. Report to Parks Canada, Western Region. Calgary, Alberta.

Documents the parasites and diseases of bighorn sheep in Jasper, Banff, Waterton Lakes and Kootenay National Parks. Focuses on the pneumonia-lungworm complex and its role in reducing sheep populations. Particular reference is made to the sheep die-off in Kootenay National Park between 1966 and 1968.
Subject: DP1 DP2 RT5 Area: A Source: KPWL CWSE

SH0467

Stevens, A. 1957.
Respiratory diseases of sheep.
Vet. Rec. 69:1249.

Reviews the respiratory diseases of sheep. Compares Pasteurella multocida, P. hemolytica and P. septica, both biochemically and pathogenically. Discusses further research to be done on vaccines.
Subject: DP1 DP2 RT5 Area: C Source: ANNB

SH0313

Taylor, W.P. 1947.
Some new techniques - hoofed mammals.
Trans. 12'th North Amer. Wildl. Conf., San Antonio, Texas. Feb. 3-5, 1947:293-322.

Briefly discusses various methods of management of hoofed mammals. Three pertain to bighorn sheep specifically : trapping and transplanting sheep in Colorado, dropping analysis for lungworm in bighorns and mineralized salt blocks for the sheep.
Subject: MA1 MA3 RT5 RT7 Area: C Source: UOAL

SH0320

Uhazy, L.S. 1969.
Lungworms and other parasites of the Rocky Mountain bighorn sheep.
Unpub. Thesis, Univ. of Alberta. Edmonton, Alberta.

A study which investigates the diseases and parasites of the Rocky Mountain bighorn sheep in the East Kootenay region of British Columbia and southwestern Alberta.
Subject: DP1 DP2 RT5 Area: A Source: CWSE KPNL UADZ

SH0322

Uhazy, L.S., J.C. Holmes and J.G. Stelfox. 1972.
Lungworms in the Rocky Mountain bighorn sheep of western Canada.
Can. J. Zool. 51(8):817-824.

A detailed analysis of lungworm infection in Rocky Mountain bighorn sheep in western Canada.
Subject: DP2 RT5 Area: A Source: CWSE KPNL KPWL UOAL

SH0323

Uhazy, L.S., J.L. Holmes and J.C. Holmes. 1971.
Coccidia of Rocky Mountain bighorn sheep in western Canada.
Can. J. Zool. 49:1461-1464.

Paper outlines the methods and results of a survey of Coccidia in the Rocky Mountain bighorn sheep. The study area is western Canada - Alberta and Kootenay National Park, British Columbia.
Subject: DP1 RT5 Area: A Source: CWSE UOAL

SH0330

Whitlock, H.V. 1959.
The recovery and identification of the first stage larvae of sheep nematodes.
Australian Vet. J. 35(7):310-316.

A method is described for separating nematode eggs from feces and culturing in a glass tube designed for the recovery of first-stage larvae. Larvae are then differentiated by characteristics similar to those used for identification of the infective stage. Histograms and measurements are given.
Subject: RT5 Area: C Source: UABA

SH0331

Williams, E.S. and C.P. Hibler. 1982.
Survey of Colorado and Wyoming bighorn sheep and mountain goats Paratuberculosis.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:173-187.

Discusses incidence of Paratuberculosis (Johne's Disease) in bighorn sheep and mountain goats in Wyoming and Colorado. The lymphocyte blastogenesis test was used in this study, as well as blood and fecal samples. The techniques are described in detail.
Subject: DP1 RT5 Area: B Source: AFWE

SH0332

Williams, E.S. and T.R.Spraker. 1979.
Paratuberculosis (Johne's disease) in bighorn sheep and a Rocky Mountain goat in Colorado.
J. Wildl. Diseases 15(2):221-227.

Discusses Paratuberculosis infections in Rocky Mountain bighorn sheep in Colorado on Mt. Evans. Includes techniques of analysis, as well as general physical symptoms of the disease.
Subject: DP1 RT5 Area: B Source: CWSE

SH0352

Woolf, A. and D.C. Kradel. 1973.
Mortality in captive bighorn sheep - clinical, hematological, and pathological observations.
J. Wildl. Diseases 9(1):12-17.

Documents the clinical, hematological and pathological findings in captive bighorn sheep in Pennsylvania. Also discusses whether or not blood analysis had prognostic value and could be used to detect the presence of subclinical disease. In addition, possible etiologic agents involved in the lung disease complex were investigated.

Subject: DP1 DP2 RT5 RT9 Area: B Source: UOAL

SH0454

Woolf, A. and D. Kradel. 1970.
Hematological values of captive Rocky Mountain bighorns.
J. Wildl. Diseases 6(1):67-68.

Took a series of blood parameters from ten captive bighorn sheep which were lightly parasitized. Some of the blood parameters were : white and red blood cells, protein, calcium, phosphorous, and so on.
Subject: RT5 RT9 Area: B Source: ANNB UOAL

POPULATION DYNAMICS (RT6)

SH0002

Aldous, M.C. and F.C. Craighead Jr. 1958.
A marking technique for bighorn sheep.
J. Wildl. Manage. 22(4):445-446.

Explains a marking technique for bighorn sheep, useful for gathering observational field data. The method is a horn brand similar to that used on cattle. The study area was Nevada.
Subject: RT6 RT7 Area: C Source: CWSE

SH0011

Armstrong, G.G. 1965.
An examination of the cementum of the teeth of Bovidae with special reference to its use in age determination.
MSc. Thesis, The Univ. of Alberta. Edmonton, Alberta.

Studies annuli in tooth cementum of bison, bighorn sheep (Ovis c. canadensis) and some Rocky Mountain goats and domestic cattle, in relationship to age judged by annual horn growth. The causes of seasonal changes in cementum and the research techniques involved are outlined in detail. Sheep were taken from the eastern slopes of the Rocky Mountains in Alberta.
Subject: RT6 PD4 Area: B Source: UADZ

SH0015

Bear, G.D. 1979.
Evaluation of bighorn transplants in two Colorado localities.
Colorado Div. of Wildl., Special Report #45.

Evaluates the short term responses of bighorn sheep following transplanting into suitable ranges adjacent to areas presently occupied by bighorn sheep. Also discusses the ecology of each study area and the methods used. The study areas are Cache la Poudre Canyon and Cebolla Creek Wildlife Area in Colorado.
Subject: MA1 RA1 RT6 Area: B Source: AFWE

SH0026

Blood, D.A. 1966.
Progress report on bighorn sheep investigations in the Rocky Mountain national parks.
Canadian Wildlife Service. Edmonton, Alberta.

A study investigating population dynamics and herd composition in Waterton and Jasper national parks. Included is data pertaining to contagious ecthyma in bighorn sheep in Banff, Jasper, Waterton, Kootenay and Glacier national parks.
Subject: PD1 PD4 RT6 DP1 Area: A Source: CWSE

SH0491

Brady, K.S. 1975.
A report on wildlife numbers and distribution. Period covered : Jan. 1974 -Feb. 1975 - Waterton Lakes National Park.
Compiled for Waterton Lakes Nat. Park Warden Service.

Documents the results of a wildlife census and distibution survey conducted in Waterton Lakes National Park during the period from Jan. 1974 to Feb. 1975. Results are included in both discussion and table form. Methodology is given some discussion.
Subject: BE2 PD1 RT6 Area: B Source: AFWL

SH0032

Brown, G.W. 1974.
Distribution and population characteristics of bighorn sheep near Thompson Falls in northwestern Montana.
MSc. Thesis, The Univ. of Montana. Missoula, Montana.

Outlines distribution, population dynamics, general behavior and diseases of bighorn sheep near Thompson Falls, northwestern Montana. Included are research techniques used in obtaining the data.
Subject: RT6 BE2 NP2 DP2 Area: B Source: CWSE

SH0035

Bunch, T.D., R.W. Meadows W.C. Foote L.N. Egbert and J.J. Spillett. 1976.
Identification of ungulate hemoglobins for law enforcement.
J. Wildl. Manage. 40(3):517-522.

Describes how to identify animal species from fresh, frozen, and air-dried blood samples through isoelectric focusing and blood protien analysis. Hemoglobins of elk, moose, pronghorn, mule deer, and desert bighorn sheep were compared to domestic sheep, cattle and swine.
Subject: RT6 Area: C Source: UOAL

SH0046

Cook, A.R. 1982.
Aerial bighorn sheep census of designated winter ranges within the Edson District of the East Slopes region.
Alta. Energy and Natural Resources, Fish and Wildl. Div. Edmonton, Alberta.

Documents results of a bighorn sheep survey of designated winter ranges within the Edson district of the East Slopes region. Uses the expanded range concept as outlined by Cook and Hall (1977).

Subject: RT6 BE2 Area: B Source: AFWE

SH0045

Cook, A.R. 1978.
Aerial sheep survey of the Edson, Red Deer and Calgary regions using the revised winter range technique.
Alta. Recreation, Parks and Wildl., Fish and Wildl. Div. Edmonton, Alberta.

Outlines the results obtained using a revised winter range technique for an aerial bighorn sheep survey of the Edson, Red Deer and Calgary regions. The method was designed to reduce survey hours while maintaining an adequate information level for management. Survey objective was to obtain an accurate count and classifiation of observable sheep within each delineated winter complex. Collected information on herd size, composition, and distribution which provided a basis for population estimates, prediction of harvestable rams, trends, and species management.
Subject: MA3 RT6 Area: B Source: AFWE

SH0429

E.M., Thomas 1957.
The value of aerial surveys in bighorn sheep management.
Proc. 37th Ann.Conf. of Western Assoc. of State Game and Fish Comm. 37:225-229.

Outlines the use of aerial surveys to study populations of bighorn sheep in Wyoming.
Subject: RT6 Area: B Source: ANNB

SH0077

Emmerich, J.M., M. Hockley and E.S. Kimber. 1982.
Electronic release system for drop nets.
North. Wild Sheep and Goat Counc., Proc. of the Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:83-91.

Discusses a release system for drop nets, developed to eliminate the danger and noise associated with blasting caps and prima cord. Includes construction techniques and illustrations.
Subject: RT6 RT7 Area: B Source: AFWE

SH0080

Erickson, J.A. 1970.
Use of drop nets and collars on study of Dall sheep.
North. Wild Sheep Counc. Meeting, Williams Lake, B.C. May 26-28, 1970 :20,21.

Outlines the use of drop nets and collars when studying Dall sheep.
Subject: RT6 RT7 Area: C Source: CWSE

SH0082

Ewaschuk, E. 1966.
Collar tagging device for bighorn sheep.
Wildl. Investigations Report, Project W-II-66. Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Outlines the construction and use of a collar tag that can be attached to bighorn sheep by the use of a snare. Details of the cost of equipmant is also given.
Subject: RT6 RT7 Area: C Source: AFWE

SH0083

Festa-Bianchet, M. 1983.
Report on a bighorn sheep - lungworm study at Sheep River, Alberta.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

A detailed study of Rocky Mountain bighorn sheep at Sheep River, Alberta. Documents population dynamics, behavior and lungworm infection of this band.
Subject: PD2 DP2 RT6 BE2 Area: B Source: CWSE

SH0103

Geist, V. 1966.
Validity of horn segment counts in aging bighorn sheep.
J. Wildl. Manage. 30(3):634-635.

Discusses the use of horn segment counts as a determinant of age in bighorn sheep in Banff National Park.
Subject: PD4 RT6 Area: B Source: CWSE

SH0112

Geist, V. 1972.
On the management of large mammals in national parks - part I.
National and Provincial Parks Assoc. of Can. Toronto, Ontario.
Park News. July 1972:8-14.

Discusses planning for, and management of large mammals in National parks. Various research methods are studied as well.
Subject: MA1 RT4 RT6 Area: C Source: CWSE

SH0181

MacCracken, J.G. 1980.
Intraspecific changes in fecal pH.
J. Wildl. Manage. 44(3):752-756.

Discusses changes in pH levels of fecal samples of deer, elk, goats and mountain sheep. Stated that changes can take place for various reasons, Varying methods of analysis also contribute to the changes, including different ways of drying the samples.
Subject: RT5 RT6 Area: C Source: CWSE

SH0188

Merchant, P., M. Hoefs T. Nette W. Kale and M. Janssen. 1982.
A simple measuring device for sheep horns.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:157-162.

Describes a measuring device for sheep horns which overcomes legal problems with the definition of 'full-curl' rules. Drawings and photographs are included.
Subject: RT6 Area: B Source: AFWE

SH0411

Morgan, N.B. 1961.
Censusing by transect.
Trans. Desert Bighorn Counc. 5:30-31.

Gives suggestions for constructing belt transects in order to make the census-taking for bighorns easier.
Subject: RT6 Area: B Source: UOAL

SH0213

Neff, D.J. 1968.
The pellet-group count technique for big game trend, census and distribution : a review.
J. Wildl. Manage. 32(3):597-614.

Discusses the method of pellet-group count as a determinant of population dynamics, range use and distributions of big game.
Subject: RT6 BE1 BE2 BE3 Area: C Source: CWSE

SH0205

Nichols, L. 1970.
Aerial inventory and classification of Dall sheep in Alaska.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. 1970:25-33.

Outlines specific research techniques used in determining population dynamics and sheep behavior. Centers mainly on the method of aerial surveying.
Subject: RT6 BE2 Area: C Source: CWSE

SH0225

Ramsey, M.A. and R.M. Sadleir. 1979.
Detection of pregnancy in living bighorn sheep by progestin determination.
J. Wildl. Manage. 43(4):970-973.

Documents the method of detecting pregnancy, by means of blood sampling, in bighorn sheep in British Columbia.
Subject: PD4 RT6 Area: B Source: CWSE UOAL

SH0246

Shackleton, D. 1969.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Research proposal for the Univ. of Calgary. Calgary, Alberta.

Outlines techniques and hypotheses upon which the investigation on the population of bighorn sheep will be based. Areas of study include Banff and Waterton National Parks.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0247

Shackleton, D.M. 1970.
An investigation of the concept of population quality of bighorn sheep (Ovis canadensis canadensis Shaw).
Progress Report for The Univ. of Calgary. Calgary, Alberta.

Looks at population quality and some behavioral aspects of Rocky Mountain

bighorn sheep in Banff and Waterton National Parks, as well as two areas in Montana. Skeletal analysis is one of the main techniqus used and discussed.
Subject: PD1 PD3 BE1 RT6 Area: B Source: KPNL

SH0427

Smith, D.R. 1955.
Management study of the Rocky Mountain bighorn sheep.
F.A. Idaho Project No. W-99-R.

Investigates the population declines of bighorn sheep in Idaho. Looks at the causes, techniques used for population dynamics, and gives management suggestions for halting the declines.
Subject: MA3 MF3 RT6 Area: B Source: ANNB

SH0276

Stelfox, J.G. 1967.
Transactions of first northern wild sheep field study, May 1-9, 1967.
Can. Wildl. Serv. Report to Parks Canada.

Outlines the daily proceedings of the study. Documents various techniques used, as well as the general conditions of the herds. The study was conducted in Kootenay, Banff and Jasper National Parks.
Subject: PD1 BW RT5 RT6 Area: A Source: KPWL

SH0291

Stelfox, J.G. 1974.
Wildlife and wildlife habitat : census inventory.
Can. Wildl. Serv. Edmonton, Alberta.

Outlines objectives and methods of surveying wildlife in North America. Discusses types of ground and aerial census techniques. Some management suggestions with respect to conservation and preservation are gives.
Subject: MA1 RT4 RT6 Area: C Source: CWSE

SH0298

Stelfox, J.G. and J. McGillis. 1977.
Ungulate surveys manual for prairie and western Canadian national parks.
Can. Wildl. Serv. Report to Parks Canada. Edmonton, Alberta.

Discusses various research techniques for determining populations, compositions, and distributions of ungulates in the prairie and western Canadian National Parks.
Subject: RT4 RT6 RA5 Area: B Source: KPWL

SH0319

Turner, J.C. 1977.
Cemental annulations as an age criterion in North American sheep.
J. Wildl. Manage. 41(2):211-217.

Discusses using cemental annulations as an age determiinant for wild sheep in the United States. Documents the correlation between age estimated by dental annuli, to that estimated by horn segments.
Subject: PD4 RT6 Area: B Source: CWSE

SH0498

Watt, R. 1983.
Wildlife survey, Waterton Lakes National Park.
Waterton Lakes Nat. Park Warden Serv.

Documents the results of aerial and ground surveys of wildlife in Waterton Lakes National Park, Feb. 3, 1983. Details of methods used and costs incurred are included.
Subject: RT6 BE2 PD1 Area: B Source: AFWL

SH0499

Watt, R. 1983.
Wildlife survey - March 26, 1983, Waterton Lakes National Park.
Waterton Lakes Nat. Park Warden Serv.

Documents results of aerial and ground surveys of wildlife in Waterton Lakes National Park, March 26, 1983. Details of methods used and costs of the operations are included.
Subject: RT6 BE2 PD1 Area: B Source: AWFL

SH0412

Welsh, G. 1964.
Boat surveys as a technique in bighorn sheep classification on Lakes Mead and Mohave in northwestern Arizona.
Trans. Desert Bighorn Counc. 8:37-42.

Discusses the advantages and disadvantages of boat surveying of bighorn sheep as compared to aerial surveys in northwestern Arizona.
Subject: RT6 Area: B Source: ANNB UOAL

SH0335

Wishart, W.D. 1962.
The Sheep River bighorn tagging program, 1955-1962.
Alta. Fish and Wildl. Edmonton, Alberta.

Describes difficulties involved in studying distributions and seasonal movements of bighorn sheep in Alberta, using methods of trapping and tagging. Includes a description of the drugs used for immobilization.
Subject: RT6 BE2 Area: B Source: AFWE

TELEMETRY, CAPTURE AND MARKING (RT7)

SH0002

Aldous, M.C. and F.C. Craighead Jr. 1958.
A marking technique for bighorn sheep.
J. Wildl. Manage. 22(4):445-446.

Explains a marking technique for bighorn sheep, useful for gathering observational field data. The method is a horn brand similar to that used

on cattle. The study area was Nevada.
Subject: RT6 RT7 Area: C Source: CWSE

SH0435

Aldous, M.C. D = 1958
Trapping and tagging of bighorn sheep.
Trans. Desert Bighorn Counc. 2:36-39.

Gives detailed descriptions of various methods used to trap and tag bighorn sheep. Cost, construction, maintenance and success of each method is outlined.
Subject: RT7 Area: B Source: ANNB UOAL

SH0016

Beason, S.L., W. Evans and L. Temple. 1980.
The drive net for capturing western big game.
J. Wildl. Manage. 44(2):478-480.

Describes the drive net as a means for capturing big game, and documents the success and efficiency.
Subject: RT7 Area: C Source: CWSE

SH0436

Crump, W.I. et al. 1961.
Trapping and transplanting of game animals. game birds, and furbearers.
F.A. Wyoming Project No. W-31-D. Cheyenne, Wyoming.

Discusses the methods of trapping and transplanting various animals in Wyoming. Included is a description of lungworms found in bighorn sheep which were transplanted.
Subject: RT7 Area: C Source: ANNB

SH0450

Deming, O.V. 1955.
Rearing bighorn lambs in captivity.
California Fish and Game 41(2):131-143.

Looks at the care of bighorn lambs being reared in captivity, as well as pregnant ewes. Possible diseases and remedies were also discussed.
Subject: MA3 RT7 Area: B Source: ANNB

SH0417

Dengler, W.F. 1968.
Wildlife research and management in Joshua Tree National Monument.
A Progress Report, Trans. Desert Bighorn Counc. 12:50-53.

This paper was concerned primarily with immobilization and marking of bighorn sheep. Includes management techniques dealing with water rehabilitation .
Subject: RT7 Area: B Source: ANNB UOAL

SH0437

Devan, G.A. 1959.
The use of the CO2 cap-chur gun at the Desert Game Range, 1958.
Trans. Desert Bighorn Counc. 3:50-52.

Discusses the effects of using the Cap-Chur gun for capturing bighorn sheep at the Desert Game Range. The drug used was nicotine alkaloid.
Subject: RT7 Area: B Source: ANNB UOAL

SH0077

Emmerich, J.M., M. Hockley and E.S. Kimber. 1982.
Electronic release system for drop nets.
North. Wild Sheep and Goat Counc., Proc. of the Third Biennial Symp., Fort Collins, Colorado. March 17-19, 1982:83-91.

Discusses a release system for drop nets, developed to eliminate the danger and noise associated with blasting caps and prima cord. Includes construction techniques and illustrations.
Subject: RT6 RT7 Area: B Source: AFWE

SH0078

Erickson, G.L. 1973.
Marking and capturing technique used at Ram Mountain sheep project.
Alta. Fish and Wildl. Div. Edmonton, Alberta.

Describes a method used for marking and capturing bighorn sheep at Ram Mountain, Alberta. A very detailed outline of each technique is given. Some methods included are : butyrate collars, drop nets, corrals, nylon collars streamers and ear tags.
Subject: RT7 Area: B Source: AFWE

SH0080

Erickson, J.A. 1970.
Use of drop nets and collars on study of Dall sheep.
North. Wild Sheep Counc. Meeting, Williams Lake, B.C. May 26-28, 1970 :20,21.

Outlines the use of drop nets and collars when studying Dall sheep.
Subject: RT6 RT7 Area: C Source: CWSE

SH0438

Erickson, J.A. 1970.
Use of drop net and collars in the study of Dall sheep.
Trans. North. Wild Sheep Counc. pp. 20-21.

Discusses cost, construction, maintenance and success of drop nets and collars in the study of Dall sheep.
Subject: RT7 Area: C Source: ANNB AFWE

SH0082

Ewaschuk, E. 1966.
Collar tagging device for bighorn sheep.
Wildl. Investigations Report, Project W-II-66. Alta. Dept. Lands and Forests, Fish and Wildl. Div. Edmonton, Alberta.

Outlines the construction and use of a collar tag that can be attached to bighorn sheep by the use of a snare. Details of the cost of equipmant is also given.
Subject: RT6 RT7 Area: C Source: AFWE

SH0098

Franzmann, A.W. and E.T. Thorne. 1970.
Physiologic values in wild bighorn sheep (Ovis canadensis canadensis) at capture, after handling, and after captivity.
J. Amer. Vet. Med. Assoc. 157(5):647-650.

Documents physiologic values in Rocky Mountain bighorn sheep at capture, after handling and after captivity. The various physiological methods used were : rectal temperature, heart rate, BUN, cholesterol, glucose, serum, total protein, magnesium, calcium, phosphorous and hemoglobin. The study objective was to determine the effect of captivity on the physiology of the sheep. Detailed technique outlines are given. The study area is Wyoming.
Subject: NP2 RT7 Area: B Source: AFWE

SH0106

Geist, V. 1967.
Report on the investigations conducted into the behavior of bighorn sheep in Banff National Park in November and December, 1966.

Detailed account of the behavior, movements, and distributions of Rocky Mountain bighorn sheep in Banff National Park. There is some discussion regarding the tagging of sheep.
Subject: BE1 BE2 RA5 RT7 Area: B Source: CWSE

SH0439

Guthrie, A.B. Jr. 1945.
Sheep and goats.
Atlantic Monthly 175(4):113-114.

Gives reasons and describes procedures for trapping and transplanting goats and mountain sheep in Montana.
Subject: RT7 Area: B Source: ANNB

SH0122

Hansen, C.G. 1964.
A dye spraying device for marking Desert bighorn sheep.
J. Wildl. Manage. 28(3):584-587.

Discusses in detail a dye spraying device used to mark Desert bighorn sheep on the Desert Game Ranch, Nevada.
Subject: RT7 Area: C Source: UOAL

SH0440

Hunter, G.N., T.R. Swem and G.W. Jones. 1946.
The trapping and transplanting of Rocky Mountain bighorn sheep in Colorado.
Trans. North Amer. Wildl. Conf. 11:364-371.

Discusses the transplanting of sheep from Sugarloaf Mountain to Pike National Forest and South Saguache County in Colorado.
Subject: RT7 Area: B Source: ANNB

SH0159

Johnson, D.M. 1980.
An improved radio-control device for remotely triggering capture equipment.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:615-623.

Describes a simple electronic device for radio controlling drop nets, rocket nets, corral traps and other equipment requiring opening or closing of a circuit. Detailed diagrams are included.
Subject: RT7 Area: C Source: AFWE

SH0442

Knudsen, M.F. 1962.
Devices for tracking bighorn sheep.
Trans. Desert Bighorn Counc. 6:53-56.

Energy sources considered were radiation from radioactive isotopes, light , audio energy, and transistor transmitters which were to be used. The receiver and transmitter were discussed in some detail.
Subject: RT7 Area: B Source: ANNB UOAL

SH0166

Kolz, A.L. and R.E. Johnson. 1980.
Self-adjusting collars for wild mammals equipped with transmitters.
J. Wildl. Manage. 44(1):273-275.

Illustrates a transmitter collar for wild mammals, which adjusts with growth.
Subject: RT7 Area: C Source: CWSE

SH0441

Koplin, J.R. 1960.
Information on tagging on the Desert Game Range.
Trans. Desert Bighorn Counc. 4:49-53.

Looks at three new methods used for tagging bighorn sheep in Nevada.
Subject: RT7 Area: B Source: ANNB UOAL

SH0169

Lacey, E.N. 1976.
The management, care and propogation of captive North American mountain sheep.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Jackson, Wyoming. Feb. 10-12, 1976:125-130.

The controlled management, nutrition, capture and transport of Dall, Stone, Rocky Mountain bighorn and California bighorn sheep are discussed. Observations on breeding, disease and behavior of the mountain sheep in captivity are cited. Studies were conducted at the Okanagan Game Farm, British Columbia.
Subject: RT7 MA1 NP1 Area: C Source: AFWE

SH0367

MacArthur, R.A., V. Geist and R.H. Johnston. 1982.
Cardiac and behavioral responses of mountain sheep to human disturbance.
J. Wildl. Manage. 46(2):351-358.

Documents telemetered heart rates (HR) and behavioral responses of mountain sheep (Ovis canadensis canadensis) reacting to human disturbance in the Sheep River Wildlife Sanctuary, southwestern Alberta. The use of HR telemetry in harrassment research is discussed as well.
Subject: NP4 PD5 RT7 Area: B Source: UOAL

SH0199

McCrory, W.P. 1969.
Final report on study of natural licks used by mountain goats and bighorn sheep in Jasper National Park.
Can. Wildl. Serv. Edmonton, Alberta.

A study outlining the location and use of natural licks in Jasper National Park by bighorn sheep and mountain goats. The licks pertaining to the sheep are Shalebanks, Snake Indian Falls and the Desolation Pass licks. Included is a description of dye-marking for more accurate research.
Subject: RT5 RT7 RA5 Area: A Source: CWSE

SH0207

Ogren, H.A. 1954.
A population study of the Rocky Mountain bighorn sheep (Ovis canadensis canadensis Shaw) on Wildhorse Island.
MSc. Thesis, Montana State Univ. Bozeman, Montana.

Documents population changes and distributions over four years of study of Rocky Mountain bighorn sheep on Wildhorse Island, Montana. The success and failure of various techniques of marking are dicussed. Diseases and parasites affecting the animals are outlined as well, and related to mortality.
Subject: PD1 MF1 DP2 RT7 Area: B Source: ANNB

SH0423

Pillmore, R.E. and C.A. Moser. 1970.
Bighorn sheep and mountain goat investigations.
F.A. Colorado Project No. W-41-R.

Topics such as artificial salting, census and distribution studies, comparitive range and stomach analysis, lambing study and predator loss of lambs, trapping and transplanting, mortality factors, management and improvement, and census techniques were covered.
Subject: BE2 RT7 DP2 Area: B Source: ANNB

SH0238

Schmidt, R. 1976.
Baiting bighorn sheep with apple pulp and trapping with a drop net.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:26-34.

Describes the use of apple pulp as a bait and the drop net trap to capture free-ranging sheep. Study conducted in the Poudre Canyon near Fort Collins, Colorado. Drawings of the drop net are also included.
Subject: RT7. Area: B Source: AFWE

SH0240

Schmidt, R.L., W.H. Rutherford and F.M. Bodenham. 1978.
Colorado bighorn sheep trapping techniques.
Wildl. Soc. Bull. 6(3):159-163.

Outlines the use of bait and traps for trapping Rocky Mountain bighorn sheep in Colorado.
Subject: RT7 Area: B Source: UOAL

SH0254

Simmons, N.M. 1970.
An inexpensive method of marking large numbers of Dall sheep for movement studies.
Trans. North. Wild Sheep Counc., Williams Lake, B.C. May 26-28, 1970 :116-124.

A detailed description of how to use aerial spraying of dyes in order to determine seasonal movements of sheep. Includes information on the necessary materials.
Subject: RT7 Area: C Source: CWSE

SH0255

Simmons, N.M. and J.L. Phillips. 1966.
Modifications of a dye-spraying device for marking Desert bighorn sheep.
J. Range Manage. 30(1):208-209.

Discusses a device which sprays dye to mark bighorn sheep in order that populations can be determined. Desert bighorn sheep in Arizona are studied.
Subject: RT7 Area: C Source: CWSE UOAL

SH0256

Simmons, N.M. and J.R. Robertson. 1970.
Progress and problems - marking and counting Dall sheep in the Mackenzie Mountains, Northwest Territories.
Trans. North. Wild Sheep Counc. 1970:5-19.

Report discusses the development of a method for surverying Dall sheep populations in the Mackenzie Mountains, N.W.T.
Subject: RT7 Area: C Source: CWSE

SH0259

Skjonsberg, T. and A. Westhaver. 1978.
A study in the chemical immobilization of animals with suggestions for the application in Canada's national parks.
Dept. of Forestry, Univ. of Montana. Missoula, Montana.

Detailed description of immobilizing effects of various drugs on wild animals. Includes methods used, reactions, dosages, side effects and recovery.
Subject: RT7 Area: C Source: KPWL

SH0262

Smith, K. 1975.
Radio telemetry as a means of studying mortality of bighorn sheep lambs (Ovis canadensis canadensis).

Proposes the use of radio telemetry as a tool for measuring Rocky Mountain bighorn lamb mortality, as it allows daily observation and examination of young, and a rapid detection of natality, morbidity and mortality. This method is also useful in determining lambing ranges.
Subject: MF1 RA5 RT7 Area: C Source: AFWE

SH0300

Stelfox, J.G. and J.R. Robertson. 1973.
Immobilizing bighorns with Anectine and Sernylan.
Can. Wildl. Serv. Edmonton, Alberta.

Report outlined and documented the use of Anectine and Sernylan to capture free-ranging bighorn sheep for weighing, tagging and transplanting purposes. The two drugs were compared as to adverse effects on the animals. The study was conducted in various national parks of the Canadian Rocky Mountains.
Subject: RT7 MA1 Area: A Source: CWSE KPNL

SH0301

Stelfox, J.G. and J.R. Robertson. 1976.
Immobilizing bighorn sheep with succinycholine chloride and phencyclidine hydrochloride.
J. Wildl. Manage. 40(1):174-176.

Documents and evaluates the tranquilizing ability of succinylcholine chloride and phencyclidine hydrochloride on bighorn sheep (Ovis canadensis) in Jasper, Banff and Kootenay National Parks.
Subject: RT7 Area: A Source: KPWL UOAL

SH0443

Sugden, L.G. 1956.
A technique for closing gates on big game live traps by remote control.
J. Wildl. Manage. 20(4):467.

Gates were closed by electrical means. Explosives detonated by a closed circuit.
Subject: RT7 Area: B Source: ANNB UOAL

SH0313

Taylor, W.P. 1947.
Some new techniques - hoofed mammals.
Trans. 12'th North Amer. Wildl. Conf., San Antonio, Texas. Feb. 3-5, 1947:293-322.

Briefly discusses various methods of management of hoofed mammals. Three pertain to bighorn sheep specifically : trapping and transplanting sheep in Colorado, dropping analysis for lungworm in bighorns and mineralized salt blocks for the sheep.
Subject: MA1 MA3 RT5 RT7 Area: C Source: UOAL

SH0444

Wishart, W. 1968.
Tagging bighorns.
Alberta 11(3):20-22.

Looks at the methods used when trapping and tagging bighorn sheep. Baiting into corral traps was prefered over tranquilizer guns. Marking was done by ear tags and painting horns.
Subject: RT7 Area: B Source: ANNB

SH0346

Wishart, W.D., K. Smith J. Jorgenson and G. Lynch. 1980.
The evolution of capturing bighorn in Alberta.
Proc. Biennial Symp. North. Wild Sheep and Goat Counc., Salmon, Idaho. April 23-25, 1980:590-600.

Discusses various methods used for capturing bighorn sheep in Alberta over the years. Details and drawings are given for a successful trap designed for a one man operation, tested on Ram Mountain, Alberta.
Subject: RT7 Area: B Source: AFWE

SH0445

Woodgerd, W. and D.J. Forrester. 1962.
Observability of colored ear markers on Rocky Mountain bighorn lambs.
Trans. Desert Bighorn Counc. 6:65-67.

Looks at the observability of colored ear markers. Finds that observation frequency is not a function of random chance, but depends on the marker color. Explains statistical methods used to arrive at this result.
Subject: RT7 Area: B Source: ANNB UOAL

NECROPSY (RT8)

SH0042

Choquette, L.P.E. and E. Broughton. 1966.
Bighorn sheep investigation.
Can. Wildl. Service. Edmonton, Alberta.

A detailed investigation into the diseases and parasites affecting bighorn sheep in Kootenay National Park. Includes specific case histories of specimens examined in the park.
Subject: DP1 RT5 RT8 Area: A Source: CWSE

SH0382

Engel, R.E. 1965.
Methods of postmortem description of wildlife ruminants with two commonly observed lesions in the bighorn sheep.
Trans. Desert Bighorn Counc. 9:68-69.

Specific protocol for recording necropsy reports was given, including description of position, size, shape, color, consistency and texture, odor, cut surface, weight, contents and lumen.
Subject: RT8 Area: B Source: UOAL ANNB

SH0354

Woolf, A., C.F. Nadler and D.C. Kradel. 1973.
Serum protein electrophoresis in bighorn sheep with chronic pneumonia.
J. Wildl. Diseases 9(1):7-11.

Study investigates the value of serum protein electrophoresis and analysis of the 5 major fractions for detecting and monitoring chronic disease in bighorn sheep. Centers predominantly on lungworm infections .The study area is Pennsylvania.
Subject: DP2 RT8 Area: B Source: UOAL

CONDITION INDICES (RT9)

SH0003

Allen, R.W. 1961.
Methods of examining bighorn sheep for parasites.
Fifth Annual Meeting, Desert Bighorn Counc., Sonora, Mexico. April 4-7, 1961:75-79.

Detailed discussion of the observation and collection of sheep specimens in the field, and the examination of specimens, diagnosis of the condition, and identification of parasites.
Subject: RT5 RT9 Area: C Source: UOAL

SH0033

Bruggemann, J., D. Giesicke and K. Walser-Karst. 1968.
Methods for studying microbial digestion in ruminants post mortem with special reference to wild species.
J. Wildl. Manage. 32(1):198-205.

Outlines the techniques for the analysis of the digestive processes of wild ruminants. This technique gives information on food selection and digestive processes. Topics covered are: digestive tract dimensions, botanical and chemical analysis of the digesta, volatile fatty acids and microbial populations.
Subject: RT9 NP2 Area: C Source: CWSE

SH0070

DeMartini, J.C. and R.B. Davies. 1977.
An epizootic of pneumonia in captive bighorn sheep infected with Muellerius sp.
J. Wildl. Diseases 13(2):117-124.

Documents incidence of disease (Muellerius spp. in particular) in captive Rocky Mountain bighorn sheep in Colorado. Results are obtained through a series of isolations of viruses and bacteria.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0383

Forrester, D.J.
The bighorn sheep lungworm - pneumonia complex.
Ms submitted to Wildlife Diseases book to be edited by John Davis.

Describes the involvement of nematodes (Protostrongylus stilesi, P. rushi, P. frosti), bacteria (Coynrbacterium, Pasteurella), and viruses (PI-3) in the lungworm-pneumonia complex of bighorn sheep. Discusses conditions favorable for starting an outbreak of the disease.
Subject: DP2 RT9 Area: B Source: ANNB

SH0095

Franzmann, A.W. 1972.
Environmental sources of variation of bighorn sheep physiologic values.
J. Wildl. Manage. 36(3):924-932.

Documents the techniques used and the results obtained for the study of physiologic values of bighorn sheep from British Columbia, Alberta, Wyoming, Montana and Washington. Illustrates how physiologic values can be used to determine environmental conditions.
Subject: NP3 PD5 RT9 Area: B Source: CWSE

SH0094

Franzmann, A.W. 1971.
Comparative physiologic values in captive and wild bighorn sheep.
J. Wildl. Diseases 7(2):105-108.

Documents and compares physiologic values of captive and wild bighorn sheep. Animals were taken from Alberta, Montana and Wyoming.
Subject: NP3 RT9 Area: B Source: UOAL

SH0096

Franzmann, A.W. 1976.
Condition assessment of Alaskan moose.
Kenai Research Centre, Alaska Dept. of Fish and Game. Alaska.

Describes a method to assess the physical condition of moose in Alaska. One can apply this technique to other large animals.
Subject: RT9 Area: C Source: CWSE

SH0097

Franzmann, A.W. and D.M. Hebert. 1971.
Variation in rectal temperature in bighorn sheep.
J. Wildl. Manage. 35(3):488-494.

Documents the technique of taking rectal temperatures of bighorn sheep. Found that the factors affecting this temperature are excitability, diet and ambient temperatures. The study was conducted on 6 different groups of sheep from western North America (including Banff, Penticton and Wasa, B.C.).
Subject: RT9 NP2 Area: B Source: CWSE

SH0126

Hebert, D.M. 1973.
Altitudinal migration as a factor in the nutrition of bighorn sheep.
PhD. Thesis, The Univ. of B.C. Vancouver, British Columbia.

A documented account detailing the nutrition of Rocky Mountain bighorn sheep in an area centered in the Rocky Mountain Trench between Elko and Premier Ridge. Outlines diet in various areas, including an analysis of nutrients. The results include research techniques employed while studying animal trials and simulated altitudinal migration, as well as the outcome of these experiments on the sheep. The paper is very specific on details regarding the subject matter.
Subject: BE2 BE3 RT9 NP1 Area: A Source: UBCL

SH0129

Hebert, D.M. 1978.
Blood chemistry as an indicator of nutritional condition in bighorn sheep.
Proc. 1978 North. Wild Sheep and Goat Conf., Penticton, B.C. April 2-4, 1978:365-388.

The paper explores the relationship between BUN, serum cholesterol, hematocrit and hemoglobin, and a host of nutritional measurements conducted under controlled conditions, at or below maintenance. The study was conducted in the East Kootenay region of British Columbia.
Subject: NP1 RT9 Area: A Source: AFWE

SH0143

Howe, D.L., G.T. Woods and G. Marquis. 1966.
Infection of bighorn sheep (Ovis canadensis) with Myoxovirus Parainfluenza-3 and other respiratory viruses.
Wildl. Diseases Assoc. Bull. 2(2):34-40.

Studies infection of bighorn sheep with Myxovirus Parainfluenza-3, and cytopathogenic effects and hemadsorption in nasal swabs and lung tissue. Tests antibodies of animals against infectious bovine rhinotracheitis virus and human Asian influenza virus. Animals studied came from Wyoming and Montana.
Subject: DP1 RT9 Area: B Source: UABA

SH0149

Hudson, R.J., W.D. Kitts and P.J. Bandy. 1970.
Monitoring parasite activity and disease in the Rocky Mountain bighorn by electrophoresis of seromucoids.
J. Wildl. Diseases 6:104-106.

Documents the measurement of host-parasite interaction between Rocky Mountain bighorn sheep and the lungworm parasite Protostrongylus stilesi. The method used is electrophoresis of seromucoids.
Subject: DP2 RT5 RT9 Area: A Source: CWSE

SH0157

Johnson, R.L. 1973.
Bighorn sheep 1973 - a biological evaluation of the Tucannon bighorn with notes on other Washington sheep.
Washington Dept. of Game.

Study investigates die-offs in the Tucannon bighorn sheep through biological investigation. Gives details of biological examinations with respect to diseases

and parasites.
Subject: DP1 DP2 RT5 RT9 Area: B Source: CWSE

SH0163

Keiss, R.W. and S.M. Morrison. 1956.
Identification of Colorado big game animals by the precipitin reaction.
J. Wildl. Manage. 20(2):169-172.

The use of the precipitin reaction for identifying big game animals (ie. - identification of protein through antiserum tests) is discussed. The study area is Colorado.
Subject: RT9 Area: B Source: CWSE

SH0230

Riney, T. 1960.
A field technique for assessing physical condition of some ungulates.
J. Wildl. Manage. 24(1):92-94.

Describes a method of assessing physical condition of deer in Southern Rhodesia. This technique can be applied to other ungulates as well.
Subject: PD3 RT9 Area: C Source: CWSE

SH0267

Spraker, T. 1976.
Capture myopathy in bighorn sheep.
Proc. Biennial Symp. North. Wild Sheep Counc., Jackson, Wyoming. Feb. 10-12, 1976:113-116.

Discusses incidence of three different clinical, but similar pathological features of an exertion myopathy encountered following transportation of Rocky Mountain bighorn sheep in South Dakota and Colorado. The three syndromes were characterized by acute death, ataxia and myoglobinuria, and bilateral rupture of the gastrocnemius muscles.
Subject: RT9 MF1 Area: B Source: AFWE

SH0268

Spraker, T.R. 1982.
An overview of the clinical signs, gross and histological lesions of the pneumonia complex on bighorn sheep.
Third Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:163-172.

Discusses the clinical features, gross and histological lesions in three types of bronchopneumonia in bighorn sheep. The three categories of mortality discussed are : all age die-offs, and two types of summer lamb mortality (verminous and stress-related).
Subject: DP2 RT9 Area: B Source: AFWE

SH0466

Stamp, J., J. Watt and J. Thomlinson. 1955.
Pasteurella Hemolytica Septicemia of lambs.
J. Comp. Path. 65:183-196

The authors gave a short review on pneumonia outbreaks in sheep. Complete post-mortem clinical signs and histological findings were given as well as

bacteriological examinations....Pathogenicity tests were run using fresh cultures from lungs, plate cultures and serum broths....Photographs were given of pathology and organisms in the lung and liver.
Subject: DP2 RT5 RT9 Area: B Source: ANNB

SH0344

Wishart, W.D. and D. Brochu. 1982.
An evaluation of horn and skull characters as a measure of population quality in Alberta bighorns.
Biennial Symp. North. Wild Sheep and Goat Counc., Fort Collins, Colorado. March 17-19, 1982:127-142.

Describes the measurement of population quality in Rocky Mountain bighorn sheep of Alberta by evaluating horn and skull characters. Compares animals from northern and southern Alberta, which inhabit different ranges. The study method is described as well.
Subject: PD4 RT9 Area: B Source: AFWE

SH0352

Woolf, A. and D.C. Kradel. 1973.
Mortality in captive bighorn sheep - clinical, hematological, and pathological observations.
J. Wildl. Diseases 9(1):12-17.

Documents the clinical, hematological and pathological findings in captive bighorn sheep in Pennsylvania. Also discusses whether or not blood analysis had prognostic value and could be used to detect the presence of subclinical disease. In addition, possible etiologic agents involved in the lung disease complex were investigated.
Subject: DP1 DP2 RT5 RT9 Area: B Source: UOAL

SH0454

Woolf, A. and D. Kradel. 1970.
Hematological values of captive Rocky Mountain bighorns.
J. Wildl. Diseases 6(1):67-68.

Took a series of blood parameters from ten captive bighorn sheep which were lightly parasitized. Some of the blood parameters were : white and red blood cells, protein, calcium, phosphorous, and so on.
Subject: RT5 RT9 Area: B Source: ANNB UOAL

APPENDIX I: EXPLANATION OF SOURCE CODES

Source codes listed for each bibliographic entry indicate the physical location at which that entry was found.

ADRI = Animal Disease Research Institute, Lethbridge
AFWE = Alberta Fish and Wildlife Library, Edmonton
AFWL = Alberta Fish and Wildlife Library, Lethbridge
ARPL = Alberta Recreation and Parks Library, Edmonton
BFWC = B.C. Fish and Wildlife Branch, Cranbrook
BFWN = B.C. Fish and Wildlife Branch, Nanaimo
BFWV = B.C. Fish and Wildlife Branch, Victoria
CWSE = Canadian Wildlife Service Library, Edmonton
DIAL = Dialog Information Services Inc.
KPNL = Kootenay National Park Naturalist Library
KPWL = Kootenay National Park Warden Library
LARS = Agriculture Canada Research Station, Lethbridge
UAAS = Univ. of Alberta Animal Science Dept., Edmonton
UADZ = Univ. of Alberta Zoology Dept., Edmonton
UABA = Biological Abstracts, Univ. of Alberta Cameron Library
UOAL = Univ. of Alberta Library
UOCL = Univ. of Calgary Library
WNPL = Waterton Lakes National Park Library

APPENDIX II: ACCESSING SPIRES SUBFILES

This appendix contains reproductions of SPIRES tutorials from the University of Alberta Computing Services dealing with searching and updating SPIRES subfiles. These subfiles are accessible to anyone having an account with the University of Alberta Computing Services and a user ID. Procedures for accessing MTS at the University of Alberta via DATAPAC are also included.

SHEEP.BIB and ELK.BIB are public subfiles in SPIRES containing bibliographic entries specific to Rocky Mountain bighorn sheep and elk-livestock-range relationships. They are maintained on magnetic disc at the University of Alberta Computing Services and administered by Parks Canada, Western Region and the Department of Forestry, Faculty of Agriculture-Forestry, University of Alberta.

Public access to these subfiles is restricted to search and display functions only. However, updating of these bibliographies by user agencies or individuals is encouraged. For information about the subfiles and obtaining updating privileges contact:

Patricia Benson
Parks Canada, Western Region
520, 220 - 4th Ave. S.E.
P.O. Box 2989, Station M
Calgary, Alberta
T2P 3H8
(403) 231-4401

1 Purpose SPIRES (Stanford Public Information REtrieval System) is a generalized information storage and retrieval system, originally developed at Stanford University. An interactive system, SPIRES allows the user to create, maintain, and search information stored on the computer.

2 Use run *spires

3 Description The functions and capabilities of SPIRES may be summarized as follows:

On-Line Help Facilities

SPIRES provides on-line tutoring for the uninitiated user. The HELP command introduces other tutorial commands such as EXPLAIN. The user can obtain detailed explanations of subfiles, commands, and errors.

On-Line Searching

SPIRES provides a clear, simple set of commands for searching at a terminal. You select the subfile you want to search and identify the elements desired. The system then finds the records containing the given value. You can broaden or narrow the search progressively.

Flexible Display of Results

Once you are satisfied with the number of results in a search, you may display all or portions of the results at the terminal. SPIRES will also format the results if you wish. When you establish a data base, you can decide how the information is to be arranged on output. Similarly, when a search result is found, you can choose a format in which the result is to be displayed. This allows the result to be presented in a variety of ways.

Applications of SPIRES

SPIRES is used in a wide variety of applications, many of which are publicly available. These include:

BOREAL: the catalogue of new acquisitions of the Boreal Institute for Northern Studies Library, Edmonton. The subfile is currently used to produce library catalogue cards, and can be searched by keyword, title, personal-author, corporate-author, and UDC (Universal Decimal

Classification) number.

COIN: a survey of computerized data bases that are publicly available in Canada. The subfile, maintained by Information Services, Alberta Research Council, contains information on the location, subject area, cost, contacts, and other details on each data base.

DATA LIBRARY: the catalogue of The University of Alberta Data Library holdings. The subfile contains detailed information on each data set recorded and can be searched by title, author, keywords, local contact, and other elements.

DOCUMENTS: a data base that describes all the written information available from Computing Services. It can be searched by keyword, area, or title.

PROGRAMLIST: a listing that describes the programs and subroutines publicly available through the Computing Services Department, University of Alberta. It can be searched by program name, title, keywords, type, and contact.

In addition, a wide variety of private subfiles have been developed, including a patient-records subfile and a student-records subfile.

4 SPIRES Terminology

SUBFILE	-	a data base consisting of data records and indexes
DATA RECORD	-	all data elements relating to an item in the subfile, for example, an individual student record. Also known as 'goal record'.
KEY	-	an element that uniquely identifies a particular data record; for example, a Social Insurance number, a Student ID number.
DATA ELEMENT	-	a single named unit of information. For example, a student's name.
ACTIVE FILE	-	an MTS line file used by SPIRES for either input or output. By default, SPIRES uses a temporary file called -SAF.
INDEX	-	a type of record used to identify records that meet given criteria
SEARCH RESULT	-	data records found by SPIRES when searching an index
SEARCH TERM	-	a value used to identify desired records
SEARCH LOGIC	-	combining search terms using the logical operators

AND, OR, and NOT. AND is used when both terms must appear in the search result, OR when one or the other or both must appear, and NOT when a term is to be excluded from the search result.

FORMAT - a means of displaying information from data records in a particular layout

GLOBAL FOR - a mode of SPIRES operation allowing the sequential location and manipulation of data records; also allows searching for unindexed information.

5 SPIRES Commands

The commands you issue are shown below in uppercase; words typed in lowercase should be replaced as necessary. Square brackets ([]) group options, which may be specified as necessary. The 'or' symbol (|) separates alternatives, only one of which may be used.

Most SPIRES commands may be abbreviated to the first three characters.

(1) HELP - explains where you are and makes suggestions about what to do next

(2) EXPLAIN term - gives information on *term*. *Term* may be a SPIRES command, an error message code, or a SPIRES term.

(3) SHOW EXPLAIN - gives a complete list of terms that can be explained with the EXPLAIN command

(4) SHOW [PRIVATE|PUBLIC] SUBFILES - the SHOW SUBFILES command gives a list of all the subfiles available to your signon ID. SHOW PRIVATE SUBFILES lists all private subfiles you have access to; SHOW PUBLIC SUBFILES lists all public subfiles.

(5) EXPLAIN SUBFILE|SF subfile name - prints the explanation provided by the file owner that is contained in a subfile's definition; not all subfiles have such an explanation

(6) SELECT subfile name - chooses a subfile for you to work with

(7) SHOW SUBFILE SIZE - displays the number of data records in the subfile

(8) SHOW ELEMENTS [DICTIONARY|NAMES] - SHOW ELEMENTS gives a list of the data element names defined for the subfile. SHOW ELEMENTS NAMES lists the data element names and aliases used; SHOW ELEMENTS DICTIONARY lists the data element names and aliases and indicates which are fixed, required, and optional.

(9) SHOW INDEXES - gives a list of the indexes available for searching

(10) BROWSE [FIRST|LAST] index
or
BROWSE index [value] - the BROWSE *index* command lists a random sample of the values found in the index requested. BROWSE FIRST *index* lists the first ten values in the index and asks if you want more. Similarly, BROWSE LAST *index* lists the last ten terms in the index and asks if you want more. BROWSE *index value* lists five terms before the value and five after and asks if you want more.

(11) FIND index [relational operator] search term - searches the index named for the search term(s) specified. Relational operators may be: = (equal to), > (greater than), < (less than), >= (greater than or equal to), <= (less than or equal to), or ¬= (not equal to). Search expressions may be combined using the logical operators AND, OR, and NOT; parentheses may be used to specify an order other than left to right.

(12) BACKUP - steps back to the previous search result, if any

(13) SHOW SEARCH - lists the search logic that has been used to generate the current search result

(14) SHOW RESULT - shows the number of records in the current search result

(15) TYPE [element list] [PAUSE|KEEP] - the TYPE command prints the data records in the current search result at the terminal, in the current format. TYPE *element-list* types those elements named in the element-list; TYPE PAUSE pauses after each record is shown, and waits for a carriage return before continuing with the next. TYPE KEEP allows you to edit the search result, keeping only those records you select.

(16) DISPLAY key - prints the record identified by *key* at the terminal

(17) OUTPUT [element-list] [CLEAR|CONTINUE] [CLEAN] - the OUTPUT command copies the search result into the current active file. OUTPUT *element-list* copies those elements named in the element-list. OUTPUT CLEAR clears the active file before copying the search result. OUTPUT CONTINUE appends the search result to the contents of the active file. OUTPUT CLEAN suppresses the record separators (**** and ;) that normally appear between records if the report option is not used with the currently set format.

(18) SET ELEMENTS [+|-] element-list - SET ELEMENTS element-list specifies which elements are to be used with the TYPE, DISPLAY, and OUTPUT commands. SET ELEMENTS + element-list adds new elements to a previously set list; SET ELEMENTS - element-list removes the elements listed from the set list. NOTE: SET ELEMENTS command will override the currently set format.

(19) CLEAR ELEMENTS - CLEAR ELEMENTS cancels any previously set elements; the TYPE, DISPLAY, and OUTPUT commands will revert to using the currently set format, or the complete element list.

(20) LIST [OFFLINE] [UNNUMBERED] - LIST will print the contents of the current active file at the terminal, with line numbers (similar to the MTS command LIST filename). LIST OFFLINE lists the active file on the printer; LIST UNNUMBERED copies the contents of the active file to the terminal, without line numbers (similar to the MTS command COPY filename).

(21) SEQUENCE [element-list] - SEQUENCE sorts records in the result according to their key; SEQUENCE element-list sorts them according to the specified elements

(22) SHOW FORMATS - lists the formats that are available for use

(23) SET FORMAT format-name - chooses a format for use with the DISPLAY, OUTPUT, and TYPE commands

(24) CLEAR FORMATS - causes the SPIRES default format to be used; this format precedes each element with its name and ends it with a ; (semicolon)

(25) SET REPORT - causes the printer control options to be used with the currently set format

(26) STOP - finishes the SPIRES session and returns you to MTS

6 Using SPIRES After signing on to MTS, issue the command:

```
run *spires
```

SPIRES prints the message of the day (if any), and indicates that it is ready to accept commands with the SPIRES prompt, ->.

7 Sample SPIRES Session

A sample SPIRES session is listed below. User input is printed in bold type; SPIRES responses are in normal type. It will cost you approximately $6 to work through this SPIRES session, if you choose to do so.

```
#run *spires
#12:21:25
 -SPIRES 83.04
->show subfiles
 -No private subfiles
  Public Subfiles.
 ACTIONS
 AGENCY
```

```
AGI
ALI
ALPFILE
AOSI
ASTIS
ASTIS AUTHOR INDEX
ASTIS GEOGRAPHIC INDEX
ASTIS SUBJECT INDEX
BACK PROCDEF
BACK RECDEF
BACKFILE
BIBLIOGRAPHY
BOREAL
BOREAL CODES
BULL-INDEX
CALDOC
CANIMM
CATALOG
     .
     .
     .
NETWORKS
PEOPLE
PERSONNEL
PPR
PROCDEF
PROG KEYWORDS
PROGRAMLIST
PROTO.LIB
PUBLIC PROTOCOLS
QZZ4.PROTOCOLS
RECDEF
RECHAR
RECLAIM
RESTAURANTS
RIE
    .
    .
    .
->explain subfile restaurants

This subfile contains data about restaurants.
Additions and modifications are encouraged as part of the
process of becoming familiar with the use of SPIRES.

The following indices may be used in your search.  BROWSE
them in order to see what values they may have.

ADDRESS (OR LOC OR LOCATION OR ADDR)
COST (Inexpensive for less than $20 per couple,
      moderate for $20 to $40 per couple,
      and expensive for more than $40 per couple.)
FOOD (the type of food served, e.g., German, pizza, machine)
MEALS (B=breakfast, L=lunch, S=supper)
```

```
 Additionally, there is a nonsearchable comments field.
 Bon Appetit.

->select restaurants
->show file size
 -The Subfile has      164 Records.
->show elements
 Record Elements
    ID
    NAME
    PHONE
    COST
    LOCATION
    FOOD
    COMMENTS
    MEALS
    PARKING
    RESERVATIONS
    WINE-LIST
->show index
 Goal Records:  RESTAURANT
 Simple Index:  N, NA, NAME
 Simple Index:  ADDR, ADDRESS, LOC, LOCATION
 Simple Index:  C, COST
 Simple Index:  CU, CUISINE, F, FOOD
 Simple Index:  H, HOURS, M, MEAL, MEALS, OPEN
->browse food
 EXQUISITE
 FRENCH
 SANDWICHES
 SIMPLE
 SPAGHETTI
 STEAKS
 UKRANIAN

->find food european
 -RESULT: 2 RESTAURANT(S)
->type


                          MOSHE'S POSH DELI

   Type of food: DELICATESSEN, EAST        Price range:  MODERATE
                 EUROPEAN, SANDWICHES,
                 SOUPS

   Address:  409 3ST. S.W.

   Phone:  232-6427

   Parking:  PUBLIC PARKING IN THE         Open:  LUNCH, DINNER (M-S)
             AREA                                 LUNCH ONLY (SUNDAY)

   Reservations:  RECOMMENDED
```

Comments: BANQUET FACILITIES UP TO 40, DINNER AND DANCE BAND NIGHTLY, CREDIT CARDS:CX MC AMX DC

...

Bistro Praha Gourmet Snack Bar

Type of food: European

Price range: moderate to expensive

Address: 10168 100A Street

Phone: 424-1046

Parking: Unfortunately, only a few meters nearby

Open: excellent quality European-style dining

Wine list: extensive

Reservations: accepted

Comments: This little obscure coffee house is THE place to go with friends who enjoy gourmet coffees, snacks, full-course meals, good wine, and good music (classical over the speakers constantly!) The atmosphere is perfect and the cuisine impeccable, with a full range of prices. Highly recommended for the Artsy crowd.

```
->find food chinese or japanese
 -RESULT: 21 RESTAURANT(S)
->and cost inexpensive
 -RESULT: 13 RESTAURANT(S)
->sequence name
 -STACK: 13 RESTAURANT(S)
->type pause
```

Bamboo Palace

Type of food: Chinese

Price range: inexpensive

Address: Cor. 81 Ave & 104 Street

Phone: 439-4444

Open: Lunch, Dinner

Wine list: Beer, Wine, Cocktails

Reservations: Unnecessary

Comments: Selections include the Peking duck, oriental style lobster, Cantonese broiled crabs, barbequed whole fish

and Western steaks. Daily Chinese smorgasbord.

... (Press Enter/Return key to continue)

Canton Kitchen

Type of food: Chinese, Western Price range: Inexpensive

Address: 10016 103 Avenue

Phone: 422-2878 Open: Breakfast, Lunch and Supper

Wine list: licensed

Comments: reasonable restaurant licensed never too busy, open til 11pm closed sundays

...

.
.
.

...

The Cathayan

Type of food: Chinese Price range: Inexpensive

Address: 10516 82 Avenue

Phone: 433-1308 Open: Lunch and supper

Wine list: Fully licensed

Reservations: Accepted

Comments: Cantonese food and some Western dishes served in newly-renovated (1975) quarters. The food is very good and service is fast. Open Monday to Thursday from 11:30am to 12:30am, to 2:30am Friday and Saturday, and from noon to 10pm Sunday.

...

```
->set element name
->type

NAME = Bamboo Palace;
```

```
NAME = Canton Kitchen;

NAME = Empress of China;

   .
   .
   .

->select cije
->explain subfile cije


 (CIJE) Current Index to Journals in Education

  Information on education literature in over 775 journals
  of interest to every segment of the educational profession.

  Read the free write-up:

  Use of ERIC T112.0381

  Available from:

  (1) Division of Educational Research Services
      Room 3-102C
      Education North Building
      The University of Alberta

  (2) Computing Services
      Room 372
      General Services Building
      The University of Alberta

 On-line searchable data base, updated every 3 months,
   from a magnetic tape received from
 (ERIC) Educational Resources Information Center

 The information is available to anyone having a Computing
 Account with Computing Services

 Report any problems to:
     SPIRES Consultants (403) 432-3884

->show file size
 -The Subfile has  103626 Records.
->show index
 Goal Records:  HIT
 Simple Index:  D, DES, DESC, DESCRIPTOR, K, KEY, KEYWORD, W, WORD
    Sub-Index:  NULL
 Simple Index:  A, AUT, AUTHOR
    Sub-Index:  NULL
 Simple Index:  T, TI, TIT, TITL, TITLE
```

```
 Simple Index:  J, JOU, JOUR, JOURN, JOURNAL
 Simple Index:  DATE, PD, PUB, PUB.DATE
 Simple Index:  L, LOC, LOCATION
 Simple Index:  INST, INSTITUTION
 Simple Index:  I, IDEN, IDENT, IDENTIFIER
->browse title computer
 COMPUTATIONNELLE
 COMPUTATIONS
 COMPUTE
 COMPUTED
 COMPUTEP
 COMPUTER
 COMPUTERISED
 COMPUTERIZATION
 COMPUTERIZE
 COMPUTERIZED
-MORE?no
->find title prefix comput
 -RESULT: 1461 HIT(S)
->or title automation
 -RESULT: 1493 HIT(S)
->and (t education or teaching or learning)
 -RESULT: 260 HIT(S)
->show search
 fin t pre comput
 or t automation
 and (t education or teaching or learning)
->type title

   TITLE = Teaching and Assessing Computational Estimation Skills.;

   TITLE = Low Cost Computer Graphics in Engineering Education.;

   TITLE = Computer Technology and Education.;

   TITLE = Improvement of Science and Mathematics Education with the
  Use of Computer-Assisted Instruction (CAI) System.;

<attn>  (Press the ATTN/PA1 key to stop.)


 ->and date >= 1980
  -RESULT: 148 HIT(S)
 ->sequence journal.cit
  -STACK: 148 HIT(S)
(Be warned that if you issue the following command, you will
receive and be charged for a 50-page document.  To look at the
contents of the active file on your terminal issue the LIST
UNNUMBERED command instead.)
 ->list off unnumbered
 #$COPY -SAF *PRINT*
 >*PRINT* ASSIGNED RECEIPT NUMBER 851461
 ->select data library
 ->show formats
```

```
 Subfile Format Names:

 FULLDOC
 SHORTDOC  (Set)

->show index
 Goal Records:  DATABASE
 Simple Index:  K, KEYWORD, KEYWORDS, T, TITLE
 Simple Index:  A, AUTHOR, I, INVESTIGATOR
 Simple Index:  TY, TYPE
 Simple Index:  D, DATE
 Simple Index:  P, PUBLISHER
 Simple Index:  SER, SERIES
 Simple Index:  ACCESS, HOLD.STATUS, ST, STATUS
 Simple Index:  ***
->show file size
 -The Subfile has     278 Records.
->show element dictionary
   ** Fixed **
   STUDY.NUMBER, STU  (key)
   DATE-ADDED, DA
   DATE-UPDATED, DU
   ** Required **
   TITLE, T, TIT
   ** Optional **
   TYPE, TY
   SEARCH, S
   VARIABLES, V
   UPDATES, U
   ABSTRACT, AB
   KEYWORDS, KEYWORD, K
   INVESTIGATOR, A, I, AUTHOR
   EXTENT, EXT
   ACCOMP.MATERIAL, ACC
   COVERAGE, COV
   CONTACT, CON
   EDITION, ED
   AVAILABILITY, AV
   FORMAT, F
   DATE, D
   PUBLISHER, P
   PLACE, PL
   COMMENTS, C
   NOTE, N
   NO.VAR, NV
   NO.CARD, NC
   CASES, CA
   SERIES, SER
   HOLD.STATUS, ACCESS, STATUS, ST
   PUBLICATIONS, PUB
->browse type
 BIBLIOGRAPHIC
 OTHER
 STATISTICAL
```

```
->browse keyword information
 INDUSTRIES
 INFANT
 INFANTS
 INFLATION
 INFLUENCE
 INFORMATION
 INSTITUTE
 INSTRUCTIONAL
 INTEGRATION
 INTENSITY
-MORE?no
->find keyword information
 -RESULT: 1 DATABASE(S)
->type

 U OF A STUDY NUMBER: 233

 DATA SET NAME: ERIC - Educational Research Information Centre

 TYPE: Bibliographic                                STATUS: Registered

 PRINCIPAL INVESTIGATOR(S):  Educational Resources Information
                             Center
 EXTENT OF FILE: 2 data files (71439, 52045 logical records) as of
 June 1981

 ABSTRACT: An educational data base maintained by the U.S.
 National Institute of Education which covers all citations,
 including abstracts, published monthly in Research in Education
 (RIE) and Current Index to Journals in Education (CIJE). Both RIE
 and CIJE data bases are now available for searching on SPIRES. At
 the present time, there 37,000 entries in RIE and 48,000 entries
 in CIJE.

 RESTRICTIONS: Available to U. of A. users

 CONTACT: Data Library
          Computing Services
          502 Students' Union Bldg.
          Phone 432-3872
->show format

 Subfile Format Names:

 FULLDOC
 SHORTDOC  (Set)

->set format fulldoc
->type

1 U OF A STUDY NUMBER: 233

 DATA SET NAME: ERIC - Educational Research Information Center
```

TYPE: Bibliographic
STATUS: Registered

PRINCIPAL INVESTIGATOR(S): Educational Resources Information Center

PUBLISHER: Educational Resources Information Center

PUB. PLACE AND DATE: Washington, D.C., 196->
UPDATES: Quarterly
EXTENT OF FILE: 2 data files (71439, 52045 logical records) as of June 1981

NOTES:
There are two ERIC files - RIE (52045 logical records) and CIJE (71439 logical records)

ABSTRACT: An educational data base maintained by the U.S. National Institute of Education which covers all citations, including abstracts, published monthly in Research in Education (RIE) and Current Index to Journals in Education (CIJE). Both RIE and CIJE data bases are now available for searching on SPIRES. At the present time, there 37,000 entries in RIE and 48,000 entries in CIJE.

VARIABLES: Abstract, Author, Date, Document type, Descriptors, Source, Title

KEYWORDS: Early childhood education
Education - Bibliography
Education administration
Education in Canada
Study and teaching

RESTRICTIONS: Available to U. of A. users

PUBLICATIONS:

CONTACT: Data Library
Computing Services
Students' Union Bldg.
Phone 432-3884

->select people
->display aheq

Sherlock Holmes, NONE GIVEN

Affiliation: Scotland Yard

Mailing address: 221 B Baker Street, London, England

Telephone - Business: None Home: None

```
   Home address:  221 B Baker Street, London, England

   Background:  London Hospital, Lab technician

   Interests:  Chess, violin, soil types, cocaine, cigar ashes,
               crime, Professor Moriarity

   Date -        Entered:  Thur. June  18, 1981
          Last modified:  Thur. June  18, 1981

 ->stop
```

8 Comments Introductory and advanced SPIRES workshops are offered by Computing Services. To register, contact the Training Assistant at 432-2511. For more information, contact the SPIRES Consultants at 432-3884.

9 More Information

As you can see from this introduction, SPIRES is an extremely versatile system for data retrieval. To learn more about SPIRES searching, purchase the manuals *SPIRES Searching Primer* T17 and *SPIRES Searching and Updating* T14 at the University Bookstore. Adding records to a SPIRES subfile is discussed in the SPIRES Updating Course; other topics are covered in the advanced sessions.

If you would like more information about SPIRES, call the SPIRES Consultants at 432-3884.

Terminal Session Exercise

If you'd like a bit of help, try the following.

```
run *spires

explain search demo
    (do SEARCH DEMO 1, 2, 3, 4, and 5)

explain display demo
    (do DISPLAY DEMO 1, 2, 3, 4, and 5 before trying on your own)

stop
```

tutorial

Computing Services
The University of Alberta

April 1983

T130.0483

Introduction to SPIRES Updating Class Notes

1 Purpose: Exposure to SPIRES file maintenance commands and techniques.

2 Prerequisites: Knowledge of MTS File Editor and SPIRES searching.

3 SPIRES Terminology

SUBFILE	-	a data base consisting of data records and indexes
DATA RECORD	-	all data elements relating to an item in the subfile, for example, an individual student record. Also known as 'goal record'.
KEY	-	an element that uniquely identifies a particular data record; for example, a Social Insurance Number, a Student ID Number.
DATA ELEMENT	-	a single named unit of information. For example, a student's name.
ACTIVE FILE	-	an MTS line file used by SPIRES for either input or output. By default, SPIRES uses a temporary file called -SAF.
FIXED	-	data elements that have a specified length and number of occurrences in every data record
REQUIRED	-	data elements that vary in length, but must occur at least once in every data record
OPTIONAL	-	data elements that may or may not occur in a data record
DEFERRED QUEUE	-	a storage area where new, changed, and deleted records are kept while awaiting processing
PROCESSING	-	taking records from the deferred queue and incorporating them into the main body of a SPIRES file, as well as building (or rebuilding) index records
SPIBILD	-	the SPIRES processor that handles file processing

and allows the addition or updating of a large group of records

BATCH MODE - adding or updating a large number of records at one time, rather than individually

SPIRES DEFAULT FORMAT - a general format for displaying records in a SPIRES subfile. Each element must begin with its name or a valid alias, followed by either a blank or an equal sign, which may be surrounded by blanks; each element must end with a semicolon. Any element whose value includes a semicolon must be enclosed by quotation marks ("). Any quotations marks within an element must be doubled, and the entire element value enclosed in quotation marks.

4 SPIRES Commands The commands you issue are shown below in uppercase; words typed in lowercase should be replaced as necessary. Square brackets ([]) group options, which may be specified as necessary. The or symbol (|) separates alternatives, only one of which may be used. Most SPIRES commands may be abbreviated to the first three characters.

(1) SELECT subfile name - chooses a subfile for you to work with

(2) SHOW SUBFILE SIZE - displays the number of data records in the subfile

(3) SHOW ELEMENTS [DICTIONARY|NAMES] - SHOW ELEMENTS gives a list of the data element names defined for the subfile. SHOW ELEMENTS NAMES lists the data element names and aliases used; SHOW ELEMENTS DICTIONARY lists the data element names and aliases and indicates which are fixed, required, and optional.

(4) CLEAR FORMATS - causes the SPIRES default format to be used

(5) USE filename - causes *filename* to become the SPIRES active file

(6) EDIT - allows the SPIRES active file to be edited, using the MTS File Editor. STOP returns to SPIRES.

(7) :editor command - allows an editor command to be issued from SPIRES command mode

(8) ADD [USING line-range] - ADD takes the contents of the active file and adds a new data record to the currently selected subfile. ADD USING line-range specifies a line-range to be used.

(9) TRANSFER key [CLEAR] - TRANSFER key places a copy of the record identified by key in the active file; if the active file is not

empty, you will be told the name of the current active file, and asked "OK to clear?". TRANSFER key CLEAR empties the active file before placing the copy of the desired record there.

(10) UPDATE [USING line-range] [key] - UPDATE causes the contents of the active file to replace the data record previously transferred; UPDATE USING line-range uses only the lines named in *line-range*. UPDATE key updates the record identified by key; it need not have been previously transferred.

(11) REMOVE key - removes the record identified by key from the selected subfile

(12) ADDUPDATE - takes the contents of the active and adds the record if it does not already exist, or updates the record if it does

(13) MERGE [USING line-range] key - MERGE takes the contents of the active file and uses them to replace, delete, or add appropriate elements to the data record identified by key. MERGE USING line-range uses only those lines included in *line-range*.

(14) USING line-range - USING line-range is an option on the ADD, UPDATE, and MERGE commands that causes only those lines included in line-range to be used. *line-range* is specified as first/last, where *first* is the first line to be used, and *last* is the last. Note: both first and last are included in the lines used.

(15) STOP - finishes the SPIRES session and returns you to MTS

5 SPIBILD Commands See the file BREN:SPIBILD.

6 Using SPIRES After signing on to MTS, issue the command:

```
run *spires
```

SPIRES prints the message of the day (if any), and indicates that it is ready to accept commands with the SPIRES prompt, '->'.

7 Using SPIBILD From SPIRES While in SPIRES, issue the command:

```
call spibild
```

You can return to SPIRES with the CALL SPIRES command.

8 Sample SPIRES Session To set up a sample SPIRES subfile to try adding and updating records, issue the MTS command:

```
    source bren:maillist
```

This will create a private subfile called "MAILING LIST" that you can use to try different ways of adding and updating records.

A sample SPIRES session is listed below. User input is printed in bold type; SPIRES responses in normal type; comments in *italics*.

```
 #run *spires
 # 14:25:10

  -SPIRES 83.04
```

EXAMPLE 1
This example uses a protocol that helps add records to the RESTAURANT subfile. Search for a restaurant to see if it is already there, if it is, think of another restaurant to add.

```
 ->select restaurants
 ->find name la boheme
 -ZERO RESULT This means la boheme is not in the
data base and can be added.
 ->..add.to.restaurant
 :Would you like help in adding elements? yes
  *
  * THIS PROTOCOL COLLECTS AN ACTIVE FILE THAT CAN BE ADDED TO
  * THE RESTAURANT FILE.  Elements are labeled either 'required'
  * or 'optional.'  If you do not want to include an optional
  * element, press return.  To exit the protocol, press 'ATTN.'
  * Note: You are collecting text in upper and lowercase.
  *
 :(Required) Restaurant Name? La Boheme
  *
  * Type the STREET ADDRESS
  * The CITY and PROVINCE will be prompted separately.
  *
 :(Required) Street Address? 64 Street & 112 Avenue
 :(Required) City & Province? Edmonton, Alberta
  *
  * Type the PHONE NUMBER in the form XXX-XXXX; do not use
  * area codes.
  *
 :(Required) Phone? unknown
  *
  * type in the cost as:
  *
  * inexpensive, moderate, expensive
  *
 :(Required) cost range? expensive
  *
  * Type as many lines of COMMENTS as you wish.
  * After you have finished your comments, press 'RETURN'
  * IN RESPONSE TO THE NEXT 'FURTHER COMMENTS?' PROMPT.
```

```
 *
:(Optional) Comments? Good French and Continental food.
:Further Comments? Service is slightly slow.
 *
 * cuisine or type-of-food should be made up of as many
 * descriptors from the following list as necessary.
 * You should state nationality and specialty.
 *
 * NATIONALITY: GERMAN, WESTERN, ITALIAN, ETC.
 * SPECIALTY: PIZZA, STEAK AND LOBSTER, ETC.
 *
:(Required) type of food french
 *
 * state availability of parking
 *
:(Optional) parking? On street
 *
 * For HOURS, use as many of these as are applicable
 *   Breakfast, Lunch, Dinner, All Day.
 * you may include explanatory phrases:
 *
:(Optional) Hours? Dinner
 *
 * For RESERVATIONS, one of these should appear:
 *   Required, Recommended, Unnecessary.
 * You may include explanatory phrases.
 *
:(Optional) Reservations? Recommended
 *
 * For WINE LIST, use only the most applicable from the
 * following list:
 *   None, Beer, Wine, Cocktails.
 *
:(Optional) Bar? Wine
 *
 * You now have part or all of a Restaurant Subfile record
 * in your active file.
 * Use Edit commands to list and edit the text you collected.
 * Type the SPIRES command ADD to add the record to Restaurants.
 * Type 'Continue XEQ' to resume the protocol.
 *
 -Type 'CONTINUE XEQ' to resume execution
X->edit
 -Editing file -BLTZK
:print /file
:       1     NAME = La Boheme;
:       2     ADDRESS = 64 Street & 112 Avenue;
:       3     ADDRESS = Edmonton, Alberta;
:       4     PHONE = unknown;
:       5     cost = expensive;
:       6     COMMENTS =
:       7     Good French and Continental food. Service is
:       8     slightly slow.;
:       9     food=french;
```

```
:      10      PARK = On street;
:      11      MEALS = Dinner;
:      12      RESERVATIONS = Recommended;
:      13      wl = Wine;
:alter 5 'e'E'
:       5      cost = Expensive;
:alter 9 'fre'Fre'
:       9      food=French;
:stop
X->add
 -Added record 327
X->cont xeq
 *
:Would you like to add another record (yes or no)? no
 * You will be returned to the Spires subfile you last selected.
->find name la boheme
-ZERO RESULT
```

Note: The result is still 0 because the added record is in the deferred queue. It can be displayed by using the DISPLAY command.

```
->display 327
```

La Boheme

Type of food: French Price range: Expensive

Address: 64 Street & 112 Avenue

Phone: unknown

Parking: On street Open: Dinner

Wine list: Wine

Reservations: Recommended

Comments: Good French and Continental food. Service is slightly slow.

EXAMPLE 2
Updating

```
->clear format
->use -saf
->transfer 327
 -SPIRES active file set to: -SAF
->edit
 -Editing file -SAF
:print /file
:       1      ID = 327;
:       2      NAME = La Boheme;
:       3      PHONE = unknown;
:       4      COST = Expensive;
:       5      LOCATION = 64 Street & 112 Avenue;
```

```
:       6       LOCATION = Edmonton, Alberta;
:       7       FOOD = French;
:       8       COMMENTS = Good French and Continental food. Service
-              is slightly slow. ;
:       9       MEALS = Dinner;
:      10       PARKING = On street;
:      11       RESERVATIONS = Recommended;
:      12       WINE-LIST = Wine;
:alter 3 'u'U'
:       3       PHONE = Unknown;
:stop
->update
->display 327
  ID = 327;
  NAME = La Boheme;
  PHONE = Unknown;
  COST = Expensive;
  LOCATION = 64 Street & 112 Avenue;
  LOCATION = Edmonton, Alberta;
  FOOD = French;
  COMMENTS = Good French and Continental food. Service is
 slightly slow. ;
  MEALS = Dinner;
  PARKING = On street;
  RESERVATIONS = Recommended;
  WINE-LIST = Wine;
```

EXAMPLE 3
This example uses the system format $prompt to add a record to the MAILING LIST subfile. This format is described more fully in SPIRES Searching and Updating T14, *section D.6.*

```
->select mailing list
->set format $prompt
->add
 -SPIRES active file set to: -SAF
: DATE-ADDED        /n (/n means: skip to the next element)
: DATE-UPDATED      /n
: NAME              John Smith
: ADDRESS(1)        4753 - 23 Avenue
: ADDRESS(2)
: CITY              Edmonton
: PROVINCE          Alberta
: POSTAL-CODE       T6V 2N9
: COUNTRY
: COMMENTS
 -Added record 1
```

EXAMPLE 4
Using the default SPIRES format

```
->clear format
```

```
->empty
->edit
 -Editing file -SAF
:i
?name Patricia Jones;
?address #302, 11436 - 121 Street
?city Edmonton;
?province Alberta;
?
:print /file
:       1     name Patricia Jones;
:       2     address #302, 11436 - 121 Street
:       3     city Edmonton;
:       4     province Alberta;
:append 2 ';'
:       2     address #302, 11436 - 121 Street;
:stop
->add
 -Added record 2
```

EXAMPLE 5
Processing and batch adding in SPIBILD

```
->call spibild
 -Spires File Builder
-process maillist
 -PASSING:        2 RECORDS OF REC-TYPE 01
      2 DEFQ RECORDS PROCESSED OF REC-TYPE 01
 -COMPUTE TIME =     0.105 SECONDS
 -ELAPSED TIME =     3.240 SECONDS
-stop
# 10:24:59  T=1.916  RC=0
#run *spires par=spibild
# 10:25:05
 -Spires File Builder
-use mailadds
-edit
 -Editing file MAILADDS
```

Note the format, each record begins with the word add; *and ends with a ; (semicolon) on a separate line.*

```
:print /file
:       1     add;
:       2     name Ann's Yarn Shop,;
:       3     address 7312 - 101 Avenue;
:       4     city Edmonton;
:       5     province Alberta;
:       6     ;
:       7     add;
:       8     n Kinsie Wool Shop;
:       9     a 82 Edmonton Centre;
:      10     c Edmonton;
:      11     p Alberta;
:      12     ;
```

```
:      13      add;
:      14      n Tika Woolcrafts;
:      15      a 10236 - 142 Street;
:      16      c Edmonton
:      17      p Alberta;
:      18      ;
:stop
-set exc -a
-batch mailing list
 -PROCESSING FILE: CSID.MAILLIST
 -COMPUTE TIME =     0.071 SECONDS
 -ELAPSED TIME =     1.230 SECONDS
 - ADD      1,      1  LINE       6.      KEY = 3
 - ADD      2,      2  LINE      12.      KEY = 4
 -Error while processing ELEM = PROVINCE
 -Update Abort.  Code=S419
 -Error at or before line       18.
 -*ADD      3,      2  LINE      18.
 -PASSING:        2 RECORDS OF REC-TYPE 01
 --- REQUESTS|SUCCESS
  ADD        3        2
  SUM        3        2
 -COMPUTE TIME =     0.104 SECONDS
 -ELAPSED TIME =     1.293 SECONDS
-use -a
-edit
 -Editing file -A
:print /file
:      13      add;
:      14      n Tika Woolcrafts;
:      15      a 10236 - 142 Street;
:      16      c Edmonton
:      17      p Alberta;
:      18      ;
:append 16 ';'
:      16      c Edmonton;
:stop
-batch mailing list
 -PROCESSING FILE: CSID.MAILLIST
 -COMPUTE TIME =     0.072 SECONDS
 -ELAPSED TIME =     1.663 SECONDS
 - ADD      1,      1  LINE      18.      KEY = 5
 -PASSING:        1 RECORDS OF REC-TYPE 01
 --- REQUESTS|SUCCESS
  ADD        1        1
  SUM        1        1
 -COMPUTE TIME =     0.088 SECONDS
 -ELAPSED TIME =     1.190 SECONDS
-call
 -821109:  SPIRES documentation is online.  SHOW NEWS for details.
 -SPIRES 82.06
```

EXAMPLE 6
Looking at all records in a subfile using Global FOR, and making corrections

```
->select mailing list
->for tree
+>display all

  REC01 = 1;
  DATE-ADDED = 01/05/83;
  DATE-UPDATED = 01/06/83;
  NAME = Smith, John;
  ADDRESS = 4753 - 23 Avenue;
  CITY = Edmonton;
  PROVINCE = Alberta;
  POSTAL-CODE = T6V2N9;
  COUNTRY = CANADA;

  REC01 = 2;
  DATE-ADDED = 01/05/83;
  DATE-UPDATED = 01/06/83;
  NAME = Jones, Patricia;
  ADDRESS = #302, 11436 - 121 Street;
  CITY = Edmonton;
  PROVINCE = Alberta;
  COUNTRY = CANADA;

  REC01 = 3;
  DATE-ADDED = 01/06/83;
  DATE-UPDATED = 01/06/83;
  NAME = Ann's Yarn Shop,;
  ADDRESS = 7312 - 101 Avenue;
  CITY = Edmonton;
  PROVINCE = Alberta;
  COUNTRY = CANADA;

  REC01 = 4;
  DATE-ADDED = 01/06/83;
  DATE-UPDATED = 01/06/83;
  NAME = Shop, Kinsie Wool;
  ADDRESS = 82 Edmonton Centre;
  CITY = Edmonton;
  PROVINCE = Alberta;
  COUNTRY = CANADA;

  REC01 = 5;
  DATE-ADDED = 01/06/83;
  DATE-UPDATED = 01/06/83;
  NAME = Woolcrafts, Tika;
  ADDRESS = 10236 - 142 Street;
  CITY = Edmonton;
  PROVINCE = Alberta;
  COUNTRY = CANADA;
+>endfor
```

```
 -End of Global FOR
->transfer 4
 -SPIRES active file set to: -SAF
->edit
 -Editing file -SAF
:print /file
:       1       REC01 = 4;
:       2       DATE-ADDED = 01/06/83;
:       3       DATE-UPDATED = 01/06/83;
:       4       NAME = Shop, Kinsie Wool;
:       5       ADDRESS = 82 Edmonton Centre;
:       6       CITY = Edmonton;
:       7       PROVINCE = Alberta;
:       8       COUNTRY = CANADA;
:replace 4
:  NAME = Shop, Kinsie Wool;
?n Kinsie Wool Shop,;
:       4     n Kinsie Wool Shop,;
:stop
->update
->transfer 5
 -Active file: -SAF
-Clear it?yes
->:print /file
:       1       REC01 = 5;
:       2       DATE-ADDED = 01/06/83;
:       3       DATE-UPDATED = 01/06/83;
:       4       NAME = Woolcrafts, Tika;
:       5       ADDRESS = 10236 - 142 Street;
:       6       CITY = Edmonton;
:       7       PROVINCE = Alberta;
:       8       COUNTRY = CANADA;
->:replace 4
:  NAME = Woolcrafts, Tika,;
?n Tika Woolcrafts;
:       4     n Tika Woolcrafts,;
->update
->call spibild
 -Spires File Builder
-process maillist
 -PASSING:        2 RECORDS OF REC-TYPE 01
      2 DEFQ RECORDS PROCESSED OF REC-TYPE 01
 -COMPUTE TIME =     0.083 SECONDS
 -ELAPSED TIME =     1.423 SECONDS
-call
 -821109:  SPIRES documentation is online.  SHOW NEWS for details.
 -SPIRES 82.06
->select mailing list
->for tree
+>display all

  REC01 = 1;
  DATE-ADDED = 01/05/83;
  DATE-UPDATED = 01/06/83;
```

```
   NAME = Smith, John;
   ADDRESS = 4753 - 23 Avenue;
   CITY = Edmonton;
   PROVINCE = Alberta;
   POSTAL-CODE = T6V2N9;
   COUNTRY = CANADA;

   REC01 = 2;
   DATE-ADDED = 01/05/83;
   DATE-UPDATED = 01/06/83;
   NAME = Jones, Patricia;
   ADDRESS = #302, 11436 - 121 Street;
   CITY = Edmonton;
   PROVINCE = Alberta;
   COUNTRY = CANADA;

   REC01 = 3;
   DATE-ADDED = 01/06/83;
   DATE-UPDATED = 01/06/83;
   NAME = Ann's Yarn Shop,;
   ADDRESS = 7312 - 101 Avenue;
   CITY = Edmonton;
   PROVINCE = Alberta;
   COUNTRY = CANADA;

   REC01 = 4;
   DATE-ADDED = 01/06/83;
   DATE-UPDATED = 01/06/83;
   NAME = Kinsie Wool Shop,;
   ADDRESS = 82 Edmonton Centre;
   CITY = Edmonton;
   PROVINCE = Alberta;
   COUNTRY = CANADA;

   REC01 = 5;
   DATE-ADDED = 01/06/83;
   DATE-UPDATED = 01/06/83;
   NAME = Tika Woolcrafts,;
   ADDRESS = 10236 - 142 Street;
   CITY = Edmonton;
   PROVINCE = Alberta;
   COUNTRY = CANADA;
+>stop
# 10:39:35  T=1.355  RC=0
```

9 More Information

As you can see from this introduction, SPIRES is an extremely versatile system for subfile maintenance. If you are interested in learning more about SPIRES updating, you may purchase the manual *SPIRES Searching and Updating* T14 at the University of Alberta Bookstore. Other topics are covered in the advanced sessions.

If you would like more information about SPIRES, call the SPIRES Consultants at 432-3884.

SPIRES Commands

(Have you tried each of the following commands?

#$run *spires

->add

->transfer _____

->update

->stop

#$run *spires par=spibild

-use _____

-batch _____

-stop

SPIRES (Stanford Public Information Retrieval System) is a generalized computer information storage and retrieval system originally developed at Stanford University. An interactive system, SPIRES allows the user to create, maintain, and search stored information on the computer.

1 How to Run SPIRES

In order to run SPIRES, you need a computer account for a use of the University of Alberta computer, an Amdahl 5860, and access to a terminal. The steps in running the program are as follows:

(1) Connect your terminal to the U of A system (MTS) by using the procedure described on page three of this write-up.

(2) Sign on by using your signon ID and password.

(3) Type in the following command:

```
run *spires
```

An example of a simple search in SPIRES would be:

```
#signon <csid>
#run *spires
-? select data library
-? show search terms
-? find keyword <keyword>
- RESULT: 3 DATABASES(S)
-? type
(The search result is displayed at your terminal)
-? stop
#signoff
```

2 How to Receive and Send Mail in Spires

The SPIRES mail facility is practical and easy to use. Occasionally when you sign on you may receive the message 'MAIL WAITING'. This means someone has used the SPIRES mail facility to send you a message. Issue the command:

```
-?show mail
```

and the message will be typed at your terminal.

After displaying the message SPIRES will ask you:

-EMPTY MAILBOX?

to which you respond 'YES' or 'NO' depending on whether you wish to keep or delete the message.

To send mail to another SPIRES user, put the message in the active file as shown below. SPIRES Active File (-SAF) is the SPIRES working file. Following this, switch to the MTS Editor mode and insert your message. You will then return to command mode and type:

send mail to account

where *account* is the signon ID of the user to whom you are sending mail.

The whole procedure is as follows:

```
#signon
#run *spires
-? empty
-SPIRES ACTIVE FILE SET TO: -SAF
-? edit
-EDITING FILE -SAF
: insert
? Enter your message,
? press the 'return'
? key each time you want
? to start another line.
? When you have finished
? your message, press
? 'return' twice.
: print/file
```

To review message before you send it.

```
1 Enter your message:
2_______
3_______
4_______
5_______
```

You can use the editor to change the text. Be careful with lowercase letters.

```
6_______
7_______
```

:alter 3 'each time'when'

This tells the editor to change the first occurrence of 'each time' to 'when' in line 3.

```
:replace 1 'Type after the "?"'
```
This tells the editor to replace line 1 with whatever is contained in the delimiters, in our case single quotes.

```
:insert 4 'Use this method.'
```
This insert command means insert the statement within delimiters after line 4 if line 4 exists or insert at line 4 if it doesn't.

```
:delete 1 4
```
This tells the editor to delete line 1,2,3, and 4.

```
:Stop
-? send mail to <csid>
```

3 How to Sign on via Datapac

For information on how to sign on to the MTS system via Datapac, refer to :

(1) the attached write-up *Datapac Access* O133.0483

(2) the manual *Terminal User* O03.0881 which is available at the Bookstore.

April 1983

.O133.0483 Datapac and Other Network Access to MTS

Our MTS system is a host computer on the Canadian Datapac Network. Datapac is a service offering of the Trans-Canada Telephone System (TCTS) and offers low-cost access to Datapac hosts from terminals in cities across the country. Datapac is considerably less expensive to use and has a much lower error rate then long distance telephone calls.

1 What Datapac Is

Datapac is a universal, shared, intelligent, packet switching network. TCTS views Datapac as the data communications parallel to its voice communications system. They foresee one network, coast to coast, permitting all types of users shared access to data and computing facilities.

The network is composed of nodes in different cities, each node containing one or more processors. The nodes are multiply connected to nodes in other cities via very high speed communications lines. The nodes contain Network Interface Machines (NIMs) which support connections to two types of customer equipment—host computers (Datapac 3000) and interactive terminals (Datapac 3101). We have a 9600 baud Datapac 3000 interface. Datapac 3101 can be accessed via 300 or 1200 baud public dial-up facilities in most cities (see list following) or via private lines to the NIM at up to 1200 baud.

2 Getting Connected to MTS

The description that follows covers the steps required to connect an interactive ASCII terminal to the NIM, the network, and to MTS.

(1) Set the terminal to 300 or 1200 baud, half duplex, even parity, and power it on.
(2) Dial the proper Datapac telephone number for your city (see following).
(3) You should hear a high-pitched tone when the NIM answers your call.
(4) Place your telephone handset in the acoustic coupler or press the dataset's DATA button.
(5) Type in the characters . PERIOD and CARRIAGE RETURN—you may have to do this twice.
(6) Datapac should respond with:

```
Datapac: xxxxxxxx
```

where xxxxxxxx is the NIM line's number.

(7) Type in the Datapac access number for Computing Services, 60100010, followed by a CARRIAGE RETURN.

(8) Datapac should respond with:

```
Datapac: CALL CONNECTED
```

and MTS should respond with the standard header:

```
UNIV OF ALBERTA COMPUTING SERVICES--C
MTS (0219-CF60/12/01)
%Enter terminal ID
```

(9) You should now enter your terminal ID, sign on and proceed normally.

The above steps assume everything goes correctly. There may be problems with Datapac or with the availability of MTS on the network. Datapac problems such as not answering the phone call should be reported to the TCTS member telephone company in the city that you are in. If our network FECP is down, the message in step 8 would be:

```
Datapac: CALL CLEARED-DESTINATION NOT RESPONDING
```

In this case, hang up and try again later. (Don't forget about the time zone differences--MTS may not be up yet.) A list of other possible Datapac generated messages follows.

3 Terminal Handling

Terminals connected through Datapac generally speaking have available to them the same facilities as terminals connected to our FECPs by more conventional means. Datapac, however, is different and introduces a few minor changes, outlined below.

3.1 Password Masking The FECP is presently unable to turn off the automatic line adapter echoing of password or BLANKed characters input from a Datapac terminal. To hide these characters, the FECP outputs a password mask string to network terminals. This works for hardcopy terminals but is inadequate for CRTs. On a CRT switch your terminal to FULL DUPLEX while keying in a password.

3.2 End-of-Line Character The only ELC currently acceptable to Datapac NIMs is the CARRIAGE RETURN character.

3.3 Pre-entry of Input Lines Datapac will only allow preentry of two input lines from a terminal and will ring your terminal's bell if preentered characters are discarded by the network. We advise against preentry over Datapac since MTS prefix characters get confusingly out of order on your terminal.

3.4 Timing Dependent Operations Operations such as paper tape or cassette tape playback into MTS from a network terminal may encounter difficulties with the delays inherent in packet switching.

4 Network Problems

Terminals connected to MTS through Datapac are passing data via a considerably different route than normally connected terminals. When problems arise a different set of error messages may be output to your terminal (see following). Problems with or suggestions about the access to MTS through Datapac should be directed to Rolly Noel (369 General Services Building, (403) 432-2460, MTS ID NOEL).

5 Automatic Signoffs

Any MTS terminal connection inactive for one hour is automatically signed off.

5.1 Datapac Telephone Numbers The public dial telephone numbers for various Canadian cities are given below. The list of Datapac cities is growing and enquiries about additional coverage should be addressed to your local telephone company. You can SOURCE NET:DatapacINFO and enter PH to get the most recent list of Datapac dial-up telephone numbers. Outside these cities you can make a long distance call to the nearest Datapac Serving Exchange (DSE) location. The telephone numbers given for the larger cities are the lead numbers of rotaries so several ports are actually available.

DSE Location **Telephone Numbers**

Province	City	Area Code	300 BPS	1200 BPS
Alberta	Calgary	403	264-9340	232-0213
	Edmonton	403	420-0185	423-4463
	Fort McMurray	403	791-2884	
	Grande Prairie	403	539-5990	
	Lethbridge	403	329-8755	327-2004
	Medicine Hat	403	526-6587	
	Red Deer	403	343-7200	342-2208

Datapac and Other Network Access to MTS

British Columbia	Kamloops	604	374-5941	
	Kelowna	604	860-0331	
	Nelson	604	354-4411	
	Prince George	604	564-4060	
	Terrace	604	635-7221	
	Vancouver	604	683-8711	687-7144
	Victoria	604	388-9300	386-0900
Manitoba	Brandon	204	725-0878	
	Winnipeg	204	475-2740	474-2710
New Brunswick	Fredericton	506	454-9462	454-4525
	Moncton	506	854-7078	854-7510
	Saint John	506	693-7399	642-2231
Newfoundland	St. John's	709	726-4920	726-5501
Nova Scotia	Halifax	902	425-6931	429-9860
	Sydney	902	539-7010	
Ontario	Barrie	705	737-4100	
	Brampton	416	791-8900	791-8950
	Brantford	519	756-0000	
	Chatham	519	354-7710	
	Clarkson	416	823-6000	
	Cornwall	613	938-9700	
	Galt	519	622-1714	
	Guelph	519	836-7930	836-7960
	Hamilton	416	523-6800	523-6900
	Kingston	613	549-7720	549-7760
	Kitchener-Waterloo	519	579-0009	579-0310
	London	519	679-7500	679-7620
	Niagara Falls	416	357-2702	
	North Bay	705	476-3900	
	Oshawa	416	579-8920	579-8950
	Ottawa	613	567-9100	567-9300
	Peterborough	705	748-6940	
	St. Catherines	416	688-5620	
	Sarnia	519	336-9920	336-0950
	Sault Ste. Marie	705	942-4960	
	Sudbury	705	673-9602	
	Toronto	416	868-4000	868-4100
	Windsor	519	255-1000	
	Woodstock	519	485-5220	
Prince Edward Island	Charlottetown	902	569-3391	
Quebec	Granby	514	375-1240	
	Jonquiere/ Chicoutimi	418	545-2272	545-2290
	Montreal	514	878-0450	878-0640
	Quebec City	418	647-4690	647-2691
	St. Hyacinthe	514	774-9270	
	Sherbrooke	819	566-2770	566-2990
	Trois Rivieres	819	373-2600	
Saskatchewan	Moose Jaw	306	693-7611	
	Regina	306	565-0111	565-0181
	Saskatoon	306	665-6660	665-7758

6 Network Generated Terminal Messages

All network-generated messages sent to a terminal connected to the Datapac network are of the form:

    Datapac: <text>

The following is a complete list of <text> generated by the Datapac network.

7 Address

is your terminal's network address. This message indicates you are connected to Datapac—proceed with your call by entering an 8 digit host address and a CARRIAGE RETURN. Our host address is 60100010.

8 Call Connected

indicates your call has been successful.

9 Invalid Address

is sent when the format of the network address you enter is invalid.

10 More Than 12 Data Characters

indicates the optional user data field in your call request is too long. Trailing and embedded blanks are counted, but leading blanks are not.

11 Re-enter

indicates a local transmission error has occurred. You will have to re-enter the input line. If the problem persists place a trouble call to the telephone company.

12 Input Data Lost

indicates a transmission error has occurred. Since part of your input line has already been forwarded by the network you will have to enter the Delete-Line Character (defaults to _ UNDERSCORE) and reenter the line.

13 Parity Error

indicates a parity error occurred during line input. Repeat the character and continue line input. If the problem persists place a trouble call.

14 Input Error

indicates a network overrun problem. If the problem persists place a trouble call.

15 Call Cleared—<cause>

where <CAUSE> is one of:

15.1 Remote Directive MTS has cleared your call—likely after SIGNOFF.

15.2 Destination Busy All of the 32 logical channels of our Datapac host interface are busy—try again later.

15.3 Temporary Network Problem Something is wrong with Datapac—try again later. Place a trouble call if the problem persists.

15.4 Destination Not Responding MTS may be down—remember the time zone differences. Call the MTS operator is the problem persists ((403) 432-3982).

15.5 Address Not In Service The address in your call request was wrong: remember MTS is at 60100010.

15.6 Local Procedure Error A network protocol error has occurred at your end of the link—try calling again. Place a trouble call if the problem persists.

15.7 Remote Procedure Error A network protocol error has occurred at our end of the link—contact Rolly Noel (369 GSB, 403-432-2460, MTS ID NOEL) with the details.

15.8 Reset—By Destination indicates MTS has reset your circuit and some of your data may have been lost. If this persists contact Rolly Noel.

15.9 Reset—Temporary Network Problem indicates Datapac has reset your circuit—continue your session. Place a trouble call if the problem persists.

15.10 Reset—Local Procedure Error indicates the network encountered a protocol problem at your end of the link: continue. Place a trouble call if the problem persists.

16 Datapac Trouble Numbers

Problems with your local telephone service such as no dial tone, reaching wrong number, etc., should be reported as indicated in your local telephone directory.

Include the following information with a trouble call:

the network message,
your name, address, city, and telephone number,
a description of the problem,
the time and date it occurred.

Alberta	Calgary	(403) 265-6703
	Edmonton	(403) 429-5502
British Columbia		(604) 688-0181
Manitoba		(204) 475-3333
New Brunswick		(800) 222-9734
Newfoundland		(709) 753-2150
Nova Scotia		(902) 421-4171
Ontario	London, area code 519 & 416	(800) 265-5925
	Toronto	(416) 862-1717
	Ottawa & area code 705	(613) 238-3103 or (800) 267-9502
Prince Edward Island		(902) 894-7313
Quebec	Montreal	(514) 875-1880
Quebec		(418) 694-1010
Saskatchewan		(306) 569-2650

17 TELENET Access to MTS

Datapac has an interface (gateway) to the Telenet network. This enables terminals in the United States, Mexico, and western Europe to access MTS via Telenet/Datapac.

From MTS you can SOURCE NET:TELENETNOS (use ID of PHONES and the password of PHONES) to list the current telephone numbers of Telenet dial-up ports.

To connect over Telenet from the US:

Dial the local Telenet number and connect your dataset
input two CARRIAGE RETURNs
enter a CARRIAGE RETURN when asked for the terminal type
enter the command C 20423 to connect to MTS
enter your terminal ID and sign on normally

For more information contact Telenet Customer Service (telephone 800-424-9458 or 202-347-2424).

18 TYMNET Access to MTS

Datapac also has a gateway to the Tymnet network with similar coverage as Telenet. For information contact them at 408-446-7000. Our network address on Tymnet is 3020;;60100010.