

TRANSACTIONS  
OF THE  
MOUNTAIN LION WORKSHOP

Nugget  
Sparks, Nevada  
January 13 & 14, 1976

Sponsor:

U. S. Fish and Wildlife Service  
Region 1

Host:

Nevada Fish and Game Department

Co-Chairmen:

Glen C. Chrsitensen - Nevada Fish and Game Department

Robert J. Fischer - USFWS, Division of Federal Aid

Harley Shaw, Research Biologist  
Arizona Game & Fish Dept.  
P.O. Box 214  
Chino Valley, Arizona 86023  
602-633-2504

## CONTENTS

	<u>Page</u>
WELCOME	1
INTRODUCTION	3
ATTENDANCE ROSTER	4
AGENDA	7
DISCUSSION SESSIONS:	
REVIEW OF PAST & CURRENT MOUNTAIN LION STUDIES	9
BIOLOGY AND LIFE HISTORY	38
POPULATION INVENTORY TECHNIQUES	92
HARVEST	114
DEPREDATION	145
MOUNTAIN LION POPULATION MODELING	177
RESEARCH AND MANAGEMENT NEEDS	192
APPENDIX	
I - AGING TECHNIQUES COMMITTEE REPORT	197
II - STANDARDIZATION OF TERMS AND MEASUREMENTS COMMITTEE REPORT - Memorandum # 1 and 2	205

## WELCOME

Glen Christensen, Nevada Fish and Game Department

I would like to express our Director's apologies for not being here today and I want to extend a warm welcome to you on his behalf. We certainly feel honored to have this group meet in Nevada and the subject of this workshop is timely.

I don't know how it is in your state, but Mt. Lions are a sensitive subject in Nevada. We are always walking the tightrope in relation to the demands of the livestock people (depredation problems), mountain lion guides (commercial exploitation), and the protectionist.

The Fish and Game Department is, as usual, caught right in the middle between all of these groups and attempting to come up with an acceptable management program. It is a difficult situation, as any of you who have worked with the management aspects are aware of. We have a long way to go and I hope this meeting will lead the way towards more progressive and definitive management programs.

Bob Fischer will fill you in a little later on with some of the background in relation to the workshop and how it originated. Actually, Bob is the one who initially sparked the idea to get this going, and he's put quite a bit of work into the program. As far as the mechanics of this workshop, it has been my feeling for many years in participating in various workshops with Fish and Game organizations that there are just too many of them that simply do not meet the mark. With this in mind, we have invited what I think is a very select group of people to attend this workshop. Any time you set up a meeting by invitation only, you are going to be subject to criticism, but I think it is going to be worth it if we can meet our workshop objectives, and if each of you have come prepared to make this a successful workshop through active participation. A workshop is just what it says--everybody should be in there with their sleeves rolled up, kicking the issues around, and trying to come up with a satisfactory solution. At the conclusion of this workshop, I hope that we have aired our common problems and have pointed a way toward trying to solve some of these problems without duplication of effort. There should be some committees formed to compile the background material as well as see some of the specific objectives through to conclusion.

I would like to see a representative of this group be able to go to the Western Association at a later date and show them that the workshop was functional.

(After some discussion concerning how to handle the minutes of the meeting, it was decided to tape the entire session and send the transcript relating to each discussion topic to the individual Discussion Leader. Nevada would be responsible for taping and transcribing. Federal Aid would pay for the secretary to transcribe. Bob Fischer would distribute transcriptions to the appropriate Discussion Leaders for editing. Final Copy to be edited by Bob Fischer and typed by Federal Aid in Portland.)

FIRST MOUNTAIN LION WORKSHOP  
January 13-14, 1976  
Sparks, Nevada

ATTENDANCE ROSTER

<u>Arizona</u>	<u>Organization</u>	<u>Mailing Address</u>
Harley Shaw John S. Phelps	Arizona Fish and Game Department Arizona Fish and Game Department	P.O. Box 609, Chino Valley, AZ 86323 222 W. Greenway Rd., Phoenix, AZ 85019
<u>California</u>		
Wally Macgregor Larry Sitton Susan Wallen Richard A. Weaver Ronald A. Thompson	California Fish and Game Department California Fish and Game Department California Fish and Game Department California Fish and Game Department U. S. Fish and Wildlife Service	1416 9th, Sacramento, CA 95814 Box R52, Lockwood, CA 93932 Box R52, Lockwood, CA 93932 1416 9th, Sacramento, CA 95814 Fed. Bldg., Room E2717, 2800 Cottage Way, Sacramento, CA 95825
Darrel Juve	U. S. Fish and Wildlife Service	Fed. Bldg., Room E2717, 2800 Cottage Way, Sacramento, CA 95825
Ray Nelson	U. S. Fish and Wildlife Service	13400 Lake Valley Dr., Auburn, CA 95603
Bob Quiroz	U. S. Fish and Wildlife Service	1240 High St., Room 15, Auburn, CA 95603
Carl Koford	University of California	Dept. Forestry & Cons., Berkeley, CA 94720
<u>Canada</u>		
Percey and Penny Dewar	British Columbia Fish and Wildlife Branch	Box 936, Parksville, B.C.
Daryll Hebert	British Columbia Fish and Wildlife Branch	324 Terminal Ave., Nanaimo, B.C.
Jack Lay	British Columbia Fish and Wildlife Branch	Abbotsford, B.C.
Terry Rock	Saskatchewan Dept. Tourism and Renewable Resources	2602 8th St. E., Saskatoon, Saskatchewan
<u>Colorado</u>		
Robert Tully	Colorado Division of Wildlife	6060 Broadway, Denver, Colorado

John Beecham  
Gary Power  
Mike Schlegel  
Maurice Hornocker

Idaho Fish and Game Department  
Idaho Fish and Game Department  
Idaho Fish and Game Department  
Cooperative Wildlife Research Unit

109 W. 44th, Boise, ID 83704  
Box 208, Challis, ID 83226  
P. O. Box 626, Kamiah, ID 83536  
University of Idaho, Moscow, ID 83843

#### Montana

Ken Greer  
Arnold Rieder

Montana Fish and Game Department  
Montana Fish and Game Department

608 So. Grand, Bozeman, MT 59715  
Boulder, MT 59632

#### New Mexico

Byron Donaldson  
Wain Evans  
William H. Martin

New Mexico Game and Fish Department  
New Mexico Game and Fish Department  
U. S. Fish and Wildlife Service

P. O. Box 716, Central, NM 88026  
State Capitol, Santa Fe, NM 87501  
P. O. Box 1306, Albuquerque, NM 87103

#### Nevada

Dave Ashman  
Glen Christensen  
Jim Jeffress  
Willie Molini  
Dick Hall  
Mike Laughlin  
Joe Miner

Nevada Fish and Game Department  
Nevada Fish and Game Department  
Nevada Fish and Game Department  
Nevada Fish and Game Department  
U. S. Fish and Wildlife Service  
U. S. Fish and Wildlife Service  
U. S. Fish and Wildlife Service

Box 296, Elko, NV 89801  
P.O. Box 10678, Reno, NV 89510  
P.O. Box 10678, Reno, NV 89510  
P.O. Box 10678, Reno, NV 89510  
Arthur Rt., Wells, NV 89835  
P.O. Box 649, Elko, NV 89801  
Room 4007, Federal Bldg., Reno, NV 8950

#### Oregon

Dave Harcombe  
Bob Fischer

Oregon Department of Fish and Wildlife  
U. S. Fish and Wildlife Service

3140 N.E. Stephens, Roseburg, OR 97470  
Division of Federal Aid, P.O. Box 3737  
Portland, OR 97208

#### Utah

Bob Oppenheimer

U. S. Fish and Wildlife Service

P.O. Box 475, Delta, UT 84624

#### Texas

Jack K. Parsons

Texas Parks and Wildlife Department

Box 1590, San Angelo, TX 76901

Washington

Organization

Mailing Address

Rich Poelker

Washington Game Department

Rt. 2, Box 1225, Port Angeles, WA  
98362

Private

Bill Butler  
Robert W. and  
Patricia Dawson  
Kent Reeves  
Ron Sherer

Expedition Films, Inc.  
  
Humboldt State University  
Private Trapper

Redwood City, CA  
P.O. Box 97, Springdale, UT 84767  
  
1008 F St., Apt. H, Arcata, CA 95521  
Boise, Idaho

MOUNTAIN LION WORKSHOP  
Nugget  
Sparks, Nevada  
January 13-14, 1976

AGENDA

<u>TIME</u>	<u>TOPIC</u>	
Tuesday, January 13, 1976		
8:00 a.m.	Welcome	Glen K. Griffith, Director Nevada Dept. of Fish & Game
8:15 a.m.	Introductions	Glen C. Christensen, Workshop Moderator
8:30 a.m.	Review of Past and Current Mt. Lion Studies.	Bob Fischer, Discussion Leader
10:00 a.m.	Coffee Break	
10:30 a.m.	Biology and Life History Standardization of Terms and Measurements. Aging Methods, Food Habits, Habitat Needs.	Maurice Hornosker Discussion Leader
12:00	Noon Lunch	
1:00 p.m.	Biology and Life History (Continued)	
2:00 p.m.	Population Inventory Techniques Aerial and Ground Surveys Tracking - Capture and Radio Monitoring.	Richard Poelker and Wally Macgregor Discussion Leaders
3:00 p.m.	Coffee Break	
3:30- 5:00 p.m.	Population Inventory Techniques (Con't.)	

TIME      TOPIC

---

Wednesday, January 14, 1975

- 8:00 a.m. Harvest      Ken Greer, Discussion Leader
  - Extent of Allowable Harvest
  - Levels of Hunting Pressure
  - Protection of Females and Young
  
- 10:00 a.m. Coffee Break
  
- 10:30 a.m. Depredation      Harley Shaw, Discussion Leader
  - Loss Assessment
  - Handling of Complaints
  - Transplanting
  
- 12:00 Noon Lunch
  
- 1:00 p.m. Depredation (Continued)
  
- 2:00 p.m. Mt. Lion Population Modeling      Ken Russel, Discussion Leader
  
- 3:00 p.m. Coffee
  
- 3:30 - Research and Management Needs      Bob Tully, Discussion Leader
  - 5:00 p.m. Discuss and List Research Needed to Solve Management Problems.
  - Cooperative Efforts Between States
  - Environmental Impact Statements
  - Endangered Species Listings

## DISCUSSION SESSIONS

### Review of Past and Current Mountain Lion Studies

Bob Fischer,  
Discussion Leader

As many of you know, the Division of Federal Aid, U. S. Fish and Wildlife Service, had many requests from State PR project biologists to sponsor this workshop. I'm not going to go into detail concerning the sequence of events in getting this workshop approved because it's a long story. Through it all I received a few wounds, which are slowly healing, but I'm reminded of what Dr. Durwood Allen told me quite a few years ago--that in this business one has to develop a thick skin in order to survive.

Well, we're here today to communicate. The main objectives of this workshop are to improve communication and to encourage the dissemination of current information of mountain lion management and research activities.

Some time ago a letter was sent to Western States and other selected agencies asking them to indicate their desire for or against a mountain lion workshop. It was at this time that Nevada graciously volunteered to host the workshop. I want to thank Director Glen Griffith and Glen Christensen, Chief of Game, for their time and effort in arranging this important get-together. The mail inquiry showed that seven of twelve States enthusiastically wanted a workshop; two were doubtful that anyone could attend because of travel restrictions; one questioned the need for the workshop and two did not reply. It is gratifying to see that all

of the Western State Fish and Game Departments, except Utah and Wyoming, are represented. I noticed that three game division people and private lion hunter from Idaho are here at their own expense. We certainly appreciate your attitude in believing that this meeting was important enough for you to absorb the expense of attending. In addition to State personnel, I see representatives from British Columbia, two Cooperative Wildlife Research Units, and the Fish and Wildlife Service.

In order to get a handle on the "Review of Past and Current Mountain Lion Studies," I wrote to each agency about a month ago requesting that they prepare for distribution a summary of past and current activities conducted on mountain lions in their respective State. So, to kick off this session, I will call on each State and agency to present this brief summary. So, to avoid missing someone, I'll call on each State in alphabetical order. First of all, I'll call on Arizona, Harley Shaw.

Arizona Game and Fish Department: Harley Shaw

I'm reporting mainly on research in Arizona rather than management programs. John Phelps is here today and he will have something to add on the management level now or later on in the program.

Very briefly we are presently completing a 5-year study of lion numbers, movements, and impact on prey species on a 150 square mile study area. Major prey species in the area are mule deer and cattle. Capture-recapture data are used for population estimates.

Lion kills are located during hunting efforts with dogs as well as by radio-tracking. Approximately 1000 radio-locations have been made covering movements of 15 different lions. These data have not yet been fully analyzed.

Suspension of field work is planned for the coming project year (July 1, 1976 - June 30, 1977) to allow for analysis and publication of data gathered to date, as well as planning of new research efforts. Possible areas of interest for future research involve evaluation of livestock losses under conditions of increased deer numbers and investigation of cattle management options which might alleviate losses to lions.

At present our interest areas so far as future research, assuming we continue on, involve evaluation of livestock losses under conditions where deer numbers are relatively high. Our study area is in a situation where the deer population is fairly low. Regarding the other aspect of it, we have some leads that we feel are along the lines of cattle management options which might alleviate losses to lions, assuming the ranchers are interested in this sort of thing and that the economics of it are feasible. We have quite a bit to learn about the ranching business, but we do have some insight in terms of management options that might help, and I think we'll get into those in the session discussions that will follow. That pretty well covers the research end of it.

California Fish and Game Department: Dick Weaver

Mr. Weaver summarized the following report:

Synopsis of California Mountain Lion Study

Historical Status

The mountain lion in California has had many changes in its status. It was classified as a predator with a bounty on its head from 1907 through 1963. During that period a total of 12,461 lions were bountied in California. In 1963 the California Legislature followed the recommendation of the Department of Fish and Game and removed the mountain lion bounty. From 1963 through 1969 the lion was classed as a nonprotected mammal. In 1969 it was reclassified as a game mammal with a license required to take them. The Fish and Game Commission was given authority to regulate the take. Sport hunting requiring hunting license and tags was in effect during the 1970-71 and 71-72 hunting seasons.

The Commission did prohibit the use of traps and poison which was formerly legal. It also prohibited the capture or possession of live lions without a permit. In 1971 the Legislature passed a bill which established a four-year moratorium (since then extended to 5-years) on the sport hunting of mountain lions and strict regulations on the taking of depredation lions. Lions could not be taken until they had caused damage and a investigation was made by the Department of Fish and Game. Then a permit could be issued for a ten-day period, which was good within ten miles of where the depredation had occurred. The Legislature directed the

Department to study the lion populations of the state, to determine the best methods of providing sound management.

### Investigations

The Department of Fish and Game started a mountain lion study in April 1971. A population survey of the lions within California was done primarily through field interviews and field investigation of reported mountain lion areas. Lion hunters, houndsmen, Department field personnel, allied state, federal and wildlife personnel, ranchers, conservationists, and those individuals we were aware of who had information on local mountain lion populations were contacted. Data on lion density and distribution was obtained.

As a result of this survey, we have determined there are approximately 74,000 square miles of lion habitat within California with an estimated population of approximately 2,400 animals. The major areas of high lion concentration occur on the coast range from Mendocino County to Del Norte County and on the coast range from Monterey south to Ventura County.

### Study Area

The second phase of our lion study was an attempt to capture and mark the lions in a designated area in southern Monterey County, follow movements, obtain indirect indices of population density and gather life history and other pertinent data.

The 170 square miles is principally chaparral and oak woodland.

The larger mammals present in the area include: domestic livestock, blacktailed deer, lion, coyote, bobcat, feral pig, blacktailed jackrabbit, cottontail rabbit, brush rabbit, bushy-tailed woodrat, gray fox, raccoon, opossum.

The area was estimated to have a population of approximately 15 lions in the statewide survey. We captured and marked fourteen adult lions and two cubs in the study area. Radio collars placed on these lions were powered by solar cells or lithium chloride batteries. Each animal was weighed, measured and examined for parasites and general condition. The mountain lions showed more overlap of range than was expected. Although not all the lions in the study area were caught. We estimate between 16-20 for the study area with a density of approximately 10 per 100 square miles.

#### Prey Species

The major mountain lion prey species in California is deer.

#### Conclusion

The status of the California mountain lion in California is secure with populations at the carrying capacity of the present habitat available.

Weaver: At the present time we have five transmitters functioning on mountain lions. We're gaining some valuable information and will continue monitoring as long as the radio collars are functioning. Past monitoring efforts were not of 24 hour duration or done on continuous days very often.

Shaw: The 15 lions captured, was that in your 150 square mile area?

Weaver: These are lions that are using it; they don't necessarily live within it. That other 50 square miles is the area that we have closed to lion hunting. Actually our study area is probably two to three times that size.

California: Ron Thompson, U. S. Fish and Wildlife Service

We assisted the California Fish and Game Department in their mountain lion study. We captured more than 14 lions, of which some were too small to collar and a few were recaptures. (Total captures were over 25 in the California Study Area--some taken by hired lion hunters). We were glad to be able to help them out.

Our program is rather small as far as depredation is concerned compared to some of the other states, but we believe that the selective removal of depredating lions by professionals is the best way to control livestock depredations. Otherwise ranchers may take things into their hands and kill many more lions than necessary. It's been our experience that usually only one or two lions are involved in the depredation. Ray Nelson is our professional lion hunter. He has dogs that he's bred and trained for almost 25 years. I'd like to introduce Ray. Ray, please stand up. And his supervisor, Bob Quiroz, from Hubbard, California, and my assistant from Sacramento, Darrel Juve.

Our records on depredation show that prior to March 1, 1972, 73 head of calves, sheep, and goats, valued at \$3,541 were killed. Since the legislature of California placed a moratorium on hunting lions on March 1, 1972, we've had six depredation requests from the Department of Fish and Game. We took five mountain lions on these six requests. There was one lion involved in each case.

Colorado Fish and Game Department: Bob Tully

Colorado had 36 years of the bounty system at \$50 per lion. Finally in 1965 the lion was classified as a big game animal with license fees set at \$5 for residents and \$10 for non-residents; in 1967 the fees were raised to \$25 and \$50. As of January 1, 1976, we've gone to \$25 resident and \$200 non-resident license fees. In 1965 we allowed a 5½ month season and at the present time there is about a 6 month season. This provides considerable hunting opportunities, but our regulations are becoming more restrictive each year. The entire state is on a quota basis but it's wide open as far as participation. When a harvest quota is reached by geographic area, we cut off the issuance of the permits. The annual harvest has been about 58 animals since 1965, and the take in 1975 of about 94 animals is the highest on record. Since 1965 we've paid out \$50,000 for 75 Just Claims of damage to livestock, and the incidents are primarily related to sheep, with 43 incidents; 14 to cattle,; 14 to horses; and 4 to a combination of goats and donkeys. We've had payments in excess of \$5,000 for damage to sheep. The landowners or livestock operators can still kill a lion to protect their livestock, and because of that the annual take varies from one to five animals. We're trying to transfer all the control efforts to sport hunting through various means. We've been fairly successful. Our lion population was estimated to be 750 in 1970 and the trend seems to be stable in some areas and increasing

in others. We now estimate that there are over 800 lions in Colorado; perhaps well over a thousand. Please understand that these are very gross estimates. The Colorado Cooperative Wildlife Research Unit, Ken Russell who's here, and Mary Jean Currier, are working with the Division of Wildlife professional hunter. With some funds from Game Conservation International, we have established a study area in an attempt to document the distribution, sex, and age composition of the population density in one of our three best lion areas. Also, the Cooperative Unit is working on a method to better determine the age of lions taken, and on the development of a population model.

Colorado Cooperative Wildlife Research Unit: Dr. Ken Russell

Bob briefly described the studies that we're engaged in. I'd like to introduce the two people who are really doing the work on those studies. Mary Jean Currier is conducting the winter census and aging technique work. She has one year's field work behind her and has several more years to go, in the aging work particularly. Steve Sheriff is just beginning work on a population model. We'll get into this in more detail as the workshop proceeds. The winter census was initiated last December. It has short range value in terms of documenting the density as best we can on a small geographic area in Colorado. This will have immediate application in terms of being helpful to management biologists in the Colorado Division of Wildlife and also being available as a public educational tool.

The aging study was initiated because of the absence of an acceptable aging technique for mountain lions. It has many problems. There are no guarantees that there is a technique by which mountain lions can be aged, so there's certainly risk involved there and many of you have worked with this aging problem yourselves. We're hoping to make some headway pursuing a more physiological than morphological approach, although we're certainly considering morphological data as well. The population model will be discussed at some length tomorrow but, very briefly, it is a utilization, an extension, of population model work that has been done at Colorado State in preceding years. Over the past five or six years, models have been developed and are now operational in setting harvest regulations. These have been developed by Jack Gross and his personnel working at the Coop Unit. So our population model really is not a new model. It is just a modification or will be a modification of existing operational models. I think that summarizes what our research program is like.

Idaho Fish and Game Department: John Beecham

Idaho really does not place much emphasis on mountain lion research. We feel like we have a pretty good data base from which to work, at least on the lion population. We do have two limited tagging projects going on at the present time that are unfunded directly since the supplies, equipment, etc., that we're using comes from my black bear research project. It's really a





































































































































































































































































































































































































