PROCEEDINGS OF THE MULE DEER WORKSHOP 1983

April 1983
Spokane,
Washington

Editors:
Don Ziegler
Woody Myers

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Hosted By

WASHINGTON DEPARTMENT OF GAME

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PREFACE

The Washington Department of Game hosted this Western State's Mule Deer Workshop in Spokane, Washington, on April 11 and 12, 1983. Don Zeigler, Regional Wildlife Biologist from Ephrata, served as chairman.

A total of 72 individuals participated in this workshop representing 11 states, 2 provinces, 4 universities and 5 federal agencies.

You will note that only abstracts from some of the presentations appear in these Proceedings. This was the decision of the voting committee if a typed manuscript was not provided to the Workshop Chairman.

We wish to thank all participants for making this workshop a useful, learning experience, especially those involved in the panel discussions and presenting papers. Dave Bartholet generously provided the artwork for the proceedings cover. A special thanks goes to Jerry King and John Musser for recording notes of the proceedings and Judy Henderson for handling the extra workload of typing this manuscript as well as her regular duties.

The 1985 mule deer workshop will be hosted by Montana Department of Fish and Wildlife and Parks.

SECTION I - INTRODUCTION

1983 Mule Deer Workshop Agenda

Ridpath Hotel - Motor Inn, Spokane, Washington

Sunday, April 10

4:00 - 7:00 PM - Registration, Room 352 (Executive Wing)

Monday, April 11

8:00 - 8:30 AM - Registration, Motor Inn Lobby

- Empire A -

8:30 - 9:00 AM - Introduction and Welcome
Larry Lennox, Deputy Director
Washington Department of Game

9:00 - 9:30 AM - Objective Approach to Deer Management
Bob Hernbrode
Colorado Division of Wildlife

9:30 - 10:00 AM - Precipitation, Drought, and Mule Deer-White-Tailed Deer Population Fluctuations in the Southwest
David Brown, Arizona Game and Fish Department

10:00 - 10:15 AM - Break

10:15 - 12:00 AM - States Status Reports - Status of Mule Deer Populations and Current Management Systems

12:00 - 1:00 PM - Lunch

1:00 - 3:00 PM - Panel Discussion - Road Management to Compliment Deer Management
Montana, Oregon, Idaho, Colorado and Washington

3:00 - 3:15 PM - Break

3:15 - 5:00 PM Panel Discussion - Quality in Deer Management, What Is It and How Does It Fit into Management Systems
Oregon, Colorado, Idaho, Washington and Arizona

6:00 PM - No Host Social Hour, Room 352 (Executive Wing)

7:00 PM - Possible Slide Show or Movie Presentation
Empire A

Tuesday, April 12 — Empire A

8:30 - 12:00 AM - Results and Management Implications of Montana's Statewide Mule Deer Research Program
Montana Deer Research Personnel

12:00 - 1:00 PM - Lunch

1:00 - 1:30 PM - Summer and Winter Bedding Site Characteristics of Deer in the Okanogan Highlands
Randy Kelly, S.C.S.
Elko, Nevada

1:30 - 2:00 PM - Vegetative Type Preferences of Mule Deer Fawns along the Columbia River, Paul Fielder
Douglas County P.U.D.
East Wenatchee, Washington

2:00 - 3:00 PM - States Status Reports - Estimating Deer Population Size and Harvest - How Do You Do It
Brief Review of Current Research

3:00 - 3:15 PM - Break

3:15 - 4:00 PM - States Reports Continued

4:00 - 5:00 PM - Business Meeting

Western States Muledeer Workshop
April 11, 12, 1983
Spokane, Washington

Name	Address	Agency
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Leonard L. Ordway	4900 E. 5th St. #703, Tucson, AZ	University of Arizona
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Wallace Macgregor	Parliament Bldg., Victoria, B.C. V8V1x4	British Columbia Fish & Wildlife Branch
Robert Fischer	Portland, OR	U.S.F & W.S.
Mike Watson	Main Floor North Tower Petroleum Plaza 9945 - 108 Street, Edmonton, Alberta	Alberta Energy and Natural Resources

SECTION II - PRESENTATIONS

Presentations

1. Objective Approach to Deer Management. (Bob Hernbrode - Colorado)

Bob Hernbrode reported on the Quadrat system and computer simulations assess harvest, demographics and populations in Colorado. Pellet group transects are within +/- 10% of the population and area quadrats average 26%, 90% of the time.

The Commission sets harvest objectives.

Population objectives are set on long term and short term bases.

Biological/political implications mesh realistically.

In dealing with real numbers, population estimates are better than can be demonstrated quantifiably.

Colorado has very comprehensive game damage laws governing agricultural and range damages.

Aerial quadrat transects do not work in some geographic areas and the techniques must be modified. Also, deer distribution is different during different winters.

The Commission adjusts harvest strategies.

A 50% reduction in the number of hunters was attained by the three-point strategy.

Only limited antlerless licenses are issued, no either-sex licenses which lack precision in management.

Computer simulations incorporated habitat alterations and past numbers of animals.

Colorado has stayed with this system for 10 years and managed by objectives.

2. Precipitation, Drought, and Mule Deer, White-tailed Deer Population Fluctuations in the Southwest (David Brown - Arizona).

David Brown reported that precipitation changes are creating a shifting arctotertiary geoflora, to chaparral and dryer habitat, from the more moisture-requiring hardwoods. Arizona and the Southwest is a focal point for changes. Riparian areas harbor whitetailed deer, but the area is becoming dryer and colder. Higher elevations are now more xeric than older forests, and an oak-characterized savannah has evolved. Ninety percent of the whitetails killed in Arizona are killed here.

The dryer, colder pinyon-juniper woodland zone was invaded by mule deer which had the advantage of being migratory and are enjoying expanding populations. Interplay between whitetail and mule deer in grassland-dry shrub areas is predicted.

There are Rocky Mountain mule deer, and desert mule deer which inhabitat the Sonoran and Mohave deserts. Whitetailed deer are found in more mesic habitats of woodland/oak/savannah.

Desert mule deer show a direct correlation between winter precipitation/forb production and recruitment rate.

Whitetailed deer are small in Arizona (90 lb. range) and show greater fawn recruitment rates in response to the drought index using mean precipatation figures. Extremes control white tailed deer populations in the Southwest. Over half of variation is explained by fawn recruitment related to the drought index.

December and January fawn survival rates are important to Rocky Mountain mule deer. In a bad year, 25 fawns/100 does, with a low extreme of 18 fawns/100 does. In a good year, 65 fawns/100 does with a high extreme of 82 fawns/100 does.

Favorable Precipitation	Drought
Forb Production	Lack of Herbaceous Vegetation Poor Ground Cover

Condition of Does

Early Ovulation Concentrated Fawn Drop	Prolonged Fawn Drop
Reduced/Concentrated Predation	Increased Predation
Increased Fawn Recruitment Rate	Decreased Fawn Recruitment Rate

Severe drought means severe population decline because of poor fawn recruitment plus loss of adults.

Wetter years tend to be warmer years.

Nearly 30% of gestation is affected by forb production (last two months)

Management Implications of Montana Statewide Research

Dick Mackie gave general findings, habitat ecology and deer relationships on the Missouri River breaks and Bridger Mountains areas.

The research crew included John Mundinger, Shawn Riley, Ken Hammel, Dave Pack and Gary Ducek.

John Mundinger provided an overview on ecology and habitat relationships in Southwest Montana, in the Bridger Mountains, Swan River Valley, Glendive, Eastern Montana and Yellowstone River areas. The objective was to measure populations and habitat requirements in these areas by tagging tracking.

In the Northwest, whitetailed deer populations showed a response to logging. Older-age animals on complex habitat areas were more stable. Some were found to be high density, low turnover rate populations. Different management strategies are required on these areas.

Ken Hammel described his work using helicopters to measure complete coverage of recruitment during March. Hammel also discussed use of the Lincoln Index in estimating deer populations.

There were significant differences in forage production and great variability in forbs which provided for no stable output or carrying capacity.

From 1960-1972, hunters were allowed 2 deer, either sex, unlimited (no permits) seasons.

From 1975-1980 bucks-only seasons were in effect. In 1981 and 1982, antlerless hunting by permit was allowed.

The population estimate had to reconcile with the previous one. In March, the number of fawns divided by 2 plus adult population equals the predicted number of adults in July.

Flights are conducted during September, March, and July.

The Bridger Mountains study described the broad relationships and detailed dynamics of the deer herd.

Implications

- Total year long environment importance
- Different environment, different strategy
- Assessment of Quality
- Assessment of potential priority

- Predictive modeling

Deer Habitat[1]

Interactions call for different strategies.

Individual populations and habitats should be considered separately, depending on diagnosis of basic deer habitats and management opportunity and constraints. There is a parallel of population characteristics, and habitat environmental characteristics.

The population should be characterized with respect to seasonal habitat requirements, allowable harvest rates and climatic/weather characteristics. Redefine hunting districts to group similar populations and habitats.

Summer and Winter Bedding Site Characteristics of Deer in the Okanogan Highlands. (Randy Kelly)

Cover requirements were described in the mixed conifer vegetative zone.

Location of bedding sites was accomplished by flushing, radiotelemetry and backtracking.

Characterization was by topographic features (elevation, slope, aspect and slope gradient). Positions (ridgetop, lib bench, bench, draw, etc.). Elements (open, rock, draw, patchy dense, uniformly dense, patchy nondense, uniformly nondense, sparse).

Canopy Cover (By DBH, species and crown density).

Summer: 55% in Douglas fir-pinegrass type.

Winter: 43% bedding activity in same type.

Summer: Significant association in Douglas fir bunchgrass.

Winter: Significant association in Douglas fir ninebark type.

Summer: 30% on 30-39% slope.

Winter: 34% on 30-39% slope.

Winter considerations were comfort gradient, thermal comfort and predator approach.

Management Implications To Increase Deer Bedding Use

A minimum of 10-13" size for Douglas Fir with longer rotation.

70-79% overstory is desirable.

Douglas Fir preferred for bedding.

SECTION III - STATUS REPORTS

MULE DEER STATUS IN THE WESTERN STATES

Alberta

Government was forced to drop the harvest questionnaire in 1980. The public felt it was too much trouble. Population estimates are largely a guess -- 90 to 100,000 M.D. Harvest estimate is 15-20,000/year which is a guess based on the 1979 questionnaire. Native harvest is a real problem. Any resident who is unemployed and "in need" can hunt for subsistance. Wolves are a problem -- don't know how serious. Hunters are given a tooth envelope. Only 4% return their tooth envelope. Habitat loss is occuring from forestry operations and agriculture and oil and gas exploration. There are Species Management Plans for the province with objectives and strategies for each. Management occurs in 15 big game zones further divided by similar vegetative types into management units. General deer season in the North part is 2 1/2 months with a one deer limit. The general bucks only gets relatively low hunting pressure. There is a 10 day doe season in November. There were 60,000 general licenses last year in the North part. The general trophy season (3 point including brow tine) in South regions got high hunting pressure during the 2 week season. The male authorization season is a random draw for residents only and is free. The general license is validated. The antlerless authorization is also free and resident only. Requirement is that antler length is less than 4". Bow only zones go for 3 months, either sex.

Arizona

Arizona has a quota system in effect for all units. With the quota system, hunters were reduced initially from 90,000 to 70,000, but are now back to 90,000. Harvest estimate is based on a mailed questionnaire. Harvest estimate is + 2% accurate statewide with a 5-10% error by management units. Populations are estimated using harvest data, herd composition, and recruitment radios. There are no antlerless hunting currently. Fawn/doe ratios in December range from 18-85 fawns/100 does.

Drought has tremendous effect on fawn survival. Populations are favorable. Precipitation above average last 4-5 years with moderate winters. The N. Kaibab deer factory is rapidly expanding. In 1972, 23% success statewide, all by permit. In 1982, more permits and more mule deer taken. Good fawn survival in 1983. Application fee of $3, reduces application pressure.

British Columbia

Hunter success 25%. Harvest estimated from 10% questionnaire. Tooth envelopes are given to all hunters when they buy their deer tag. Populations are estimated by using pellet counts, aerial counts, track counts, and herd composition. Populations are modeled using above information and harvest data. All hunters in B.C. are issued a

permanent hunting number which is helpful in integrating data and contact by computer. Wolf predation and subsistence hunting (as in Alberta) is a problem for this area. Population is down after the hard winter of 81-82, but 82-83 was mild with good survival. B.C. has a general buck season with a limited number of days antlerless season in the Central Interior. Hunting license cost doubled, up $8.00. There has been increased wildlife work under the Habitat Conservation Fund to increase deer populations, such as acquisitions, burning, etc. No drop in licenses sold with license increase, 130,000 sold, 25% success.

Colorado

Populations are estimated within 5% accuracy using pellet transects and area quadrat method. Population estimation efforts are concentrated on a rotation basis. All herd units have been defined and computer modeled. They have simplified Pop. 50 program which can be used on an Apple II Computer. Contact Bob Hernbrode if interested. Colorado is writing their second round of spp. management plans. They plan to increase statewide population of mule deer 30% by 1988. Season opening dates are set for 3 years by their commission. Harvest estimates were obtained by 16% questionnaire. Colorado gets a 75% return on questionnaires sent with 3 mailings. Antlerless licenses are issued there and no either sex permits. In 1982, 175,000 hunters killed 75,100 deer, which equates to an overall success rate of 43%. Success rates: archer 26%, muzzleloader 36%, and early buck 22%, (250 permits wilderness areas). Colorado classifies 45-50,000/year. Much of the classification is done by helicopter. They spend $250,000 a year on helicopter time for deer. Post season buck/doe ratios average 10-15 by herd unit objective-population, composition and harvest. Colorado has the following: September high country quality hunts in wilderness areas, 3-4,000 muzzleloading licenses, 23 and 30 day archery seasons, wide open buck hunting, antlerless licenses on a limited basis, only in extreme cases. There are problems selling antlerless licenses to the hunting public. Over half of the high plains area is buck only. After 1978, was a recovery period following a 47% loss in the Piceance Basin. In 1978-79 pressure was focused away, the season shortened, and through the media hunters were told to go elsewhere. Antlerless deer were harvested at less than 5%. Archery and muzzleloader seasons are either/or. Limited licenses are issued after a statewide computer drawing. Opening dates only are set for a 3 year period. Seasons are set in March.

Idaho

Telephone questionnaires have been used instead of mailing them since 1979 to avoid no response bias. 6.1% of tag buyers are contacted at an average cost of $1.30/contact. Population estimated at 300,000. Harvest = 40,000/year. Herd composition, aerial trend, and population distribution surveys are used with harvest estimates to estimate population.

Montana

Has a good population currently allowing 3 deer/hunter in some areas. Season open for bucks only with antlerless permits. Some areas are general either sex. Montana is into road management. 90% of hunters are in favor of program (50% want the program expanded). Telephone surveys replaced mailed questionnaire two years ago. Telephone reduces the no response bias, improves quality of information, and is cheaper. They save $36,000/year. Herd composition and harvest data are used to estimate population. Some good mule deer range is completely covered by helicopter. Lincoln index used in conjunction with other methods. They are beginning to use computer modeling and expect to use more in the future. Spending lots of money on research over extensive areas. Difficult areas have completely different population dynamics. You can't manage for average age without additional information. Documenting importance of summer range for over winter survival. From 1960 through 1983 Montana has had 5 severe winters. They are suggesting a 10 year cycle for deer populations in some areas. Post season buck ratios run from 26 to 12/100 does. There is no evidence that increased buck harvest or hunting during the rut causes decreased fawn production or survival. 90% of fawn mortality that occurs between birth and fall is attributed to coyote predation. 50% of winter mortality on fawns is caused by the coyote. Alternative prey base is a very important factor.

Nevada

Herd declines of early 70's and resulting political pressure has resulted in conservative full quota hunting since 1976. Pre-quota there was 11-14% success on bucks. Since, quota hunter success for bucks is 43%. In 1982, there was 60% success statewide. Harvest estimated by mandatory hunter report card. 90% of these report cards are returned. Populations are estimated using harvest data and intensive herd composition work done by helicopter. In 1976, population estimates were 80-90,000 deer, in 1982, 140,000 deer. The winter of 1981-82 was severe and caused substantial fawn losses. Five to six hundred helicopter hours/year are used in mule deer related work. 30,000 mule deer are classified in the winter and 40,000 in the spring. Nevada is working hard on computer modeling. Post season composition = 20-35 buck/100 does/29 fawns. 20-25,000 deer hunters/year with a 50-90% success rate. 10% questionnaire was dropped in the mid-70's. Questionnaire figures were exaggerated compared to mandatory hunter reports.

New Mexico

Estimated mule deer population of 278,000. 100,000 hunters harvested 20,000 deer. All seasons are stratified by weapon choice and time. Harvest is estimated by 15% questionnaire. Winter helicopter surveys gather composition data. Composition and harvest data are used to estimate population. Computer modeling of population developed. State contracted outside statistician and programmer to develop program. Post season fawn/doe = 45/100.

Oregon

130,000 hunters. 11,000 mule deer bow hunters -- 37 day either sex season -- harvest 1,700 deer. Success rate of the bow hunter: elk 10% and deer 20-25%. Total harvest for 1982 was 30,000. Post season composition -- 12 bucks/100 does/48 fawns. Heavily into road management. Road management is justified by decreased harassment, increased buck/bull escapement, increased snag tree survival, and reduced resource damage. Increased hunting quality is a byproduct. Oregons' questionnaire on road management yielded 49% liked the present amount of road closures, and 6% want less. Oregon is going to a green dot system for road management. Green dot system saves 66% of installation cost and 94% of maintenance cost compared to a full sign program. 10% questionnaire use to estimate harvest - 60% return. Separate questionnaire used to estimate bow harvest - 50% return. Bow hunters as a group are reluctant to cooperate. (I.e., card and questionnaire returns.) Deer are managed by herd unit objective. 20,000 mule deer are classified/year. Additional 40,000 animals counted per harvest, composition, and trend figures. Post season ratios from 10-25 bucks/100 does. Ratio depends on area and unit objectives. Level of antlerless hunting depends on unit population, unit objective and recruitment for area.

Utah

The last 12 years have been detrimental to deer survival. The early 70's decline was due to heavy winters, droughty summers and winds in spring which dessicate rangelands. 1971, 72, 74 and 77 were bad drought years. The 1972-73 winter took over 50% of the entire population, mostly fawns. Then late spring snow and depressed fawn productivity. The winters of 1974-75 and 1978-79 were severe with the result of fawn losses. In 1981-82, snow depths were at an all-time record in the Northern part of the state (700" of snow last winter at Alta, North of Salt Lake). The antlerless segment may have been hunted too heavily at times. In 1962, 40,000 antlerless permits were issued. Habitat loss has occurred on summer ranges, and urban sprawl, highway construction and mining contributed to overall loss. Since 1975, seasons have been 11 days buck only with antlerless permits. Antlerless control permits are hunter choice and allow a second deer (1 during general, 1 late). In Utah, the central Southeast is making a slower recovery. The past winter was mild until the last 2 months

in the north. It snowed 140" in the last 2 weeks. Range and depredation problems are ongoing. The 1981 harvest of 76,600 bucks was a record harvest, made up of almost 80% yearling bucks from 1980 production. In 1982, 70,000 bucks were harvested. License sales increased to 205,000, reflecting improved deer conditions. Non-resident license limit is 20,000. There are 15-16,000 control permits and 15-26.000 archery hunters. The post-season for muzzleloaders, the first Saturday in November, is unpopular. The general season is again buck only with permits for crop depredation. Eleven days buck only, 70,132 bucks, 36% success, 41% in 1981.

Washington

10% questionnaire used to estimate harvest. Ten year average buck harvest = 44,000. 1982 = 42,000. Mule deer comprise 32% of state deer population. Regional contribution of mule deer: Region 1--containing 39% of the mule deer population, Region 2--containing 38% of the population, and Region 3--containing 23% of the population. No significant population increase is expected in any Eastern Washington mule deer area. There are local expectations. No good estimates of population. Population trend indicator used on demand. Conservative antlerless harvest due to political pressure. Tooth envelopes given to permit holders. Post season composition: Region 1--8 bucks/100 does/60 fawns (open breaks); 15 bucks/100 does/50 fawns (mountain units). Region 2--9 bucks/100 does/70 fawns--Average. Region 3--11 bucks/100 does/60 fawns--Average. The Department is committed to weapon allocation in 1984. Successful hunter report card this year -- 47.5% return.

Wyoming

Population estimates at 416,000. 108,000 hunters harvest 51,000 bucks, and 16,000 antlerless. Harvest questionnaire is sent to all license buyers. This program is run by W.G.F. and U. of W. 75% of questionnaires are returned. Harvest data is 90% confident. Pre-hunt classification, harvest data and post hunt classification are used for computer model populations. Pop. 50 program. Subdivision development is taking place on critical range and the population is declining slightly. Management is by herd unit objectives. There are 158 hunt areas and non-residents are restricted to a quota. There are restrictive seasons and management areas.

SECTION IV - PANEL DICUSSIONS

Panel Discussion on Road Management

Members: Tom Leege - Idaho
Dan Eastman - Oregon
Tom Juelson - Washington
John Mundinger - Montana

Tom Juelson introduced the subject of proliferation on roads in big game areas by summarizing the Symposium in Couer D'alene.

Objectives:

1. Habitat loss/deterioration concerns:

   a. Reduced or restricted use of the area on either side of the road.

   b. Reducing the density of hunters in an area.

   c. Reduction of the number of deer killed on the first day and extending the length of time and spreading the kill over a longer period.

   d. Closures and subsequent management.

      1) Obliterate and put back into growing trees and other vegitation.

      2) Close off ends with tank traps.

      3) Locked gates to provide service traffic but no recreation.

      4) Signing for service road only.

      5) Seasonal vs. year-round closures. Winter range, hunting season, fawning season.

      6) Reduced access on complete closure.

Road Management concerns in cooperation with the U.S. Forest Service, Department of Natural Resources and Timber companies.

1. Answer to a broad range of publics - loggers, firewood gatherers, hunters, and etc.

2. Cost-share agreements, dependent on the amount of recreational use.

3. The time required to reach road management agreements.

4. Costs.

5. Open roads designation vs. closed:

a. Sign roads open, others are automatically closed to reduce tearing down signs.

6. Restriction of the aged or infirm.

7. Preventing the picking up of animals harvested.

8. Self-enforcing.

Dan Eastman - Staff Biologist, Oregon Fish and Wildlife: Road closures are complimentary to deer management and go beyond, to elk and to the human impact on the resource and its habitat.

Maintains the wildlife oriented recreational experience and the ethic of fair chase. Fifteen years ago, as the proliferation of roads became worrisome, the Department began working with land management agencies and what they planned for the future.

On deer migration routes and crossings, roads produced a ten-fold increase in vulnerability.

Bob Stein stated that 26% of the hunters in Wallowa County felt there were too many roads. In 1971, the Department was given the Statutory authority to enter into agreements with land management agencies, to minimize harassment when the animals require solitude and to maintain hunting quality.

The pilot project in Oregon covered a 200,000 acre area. Eighty percent of the road miles were closed and all cross country vehicular travel was prohibited. Eighty-seven percent of the users favored the closures. By 1976, there were two million acres under agreement. Most were hunting season only and some were year round closures.

Standards

1. Black lettering on yellow signs. The Forest Service favored ivory on brown.

2. Provision of a map plus posting, allowing the motor vehicle there and nowhere else.

3. Provision of a 300 ft. camping zone on either side of an open road. Administrative uses were handled by permit by the agency. Violators faced a minimum bail of $55 or $105 apiece during the Wallowa County elk season. Of 3,388 respondents, 85% supported road management, 49% present level, 46% wanted more and 6% favored a reduced level of road management.

Positive aspects of the green reflector system (you can go here and nowhere else).

1. Reduced legwork to post and de-post areas.

2. Positive posting, consistent with the map.

3. Less subject to vandalism since the user would be doing himself harm.

4. Reduced maintenance costs.

Rules for Success

1. Public notice of restrictions with a map posted.

2. Approval from the Forest Service.

3. All permittees are mailed a map.

4. Try to keep permanency.

5. Give people notice.

Benefits to the Land Management Agency

1. Fewer litter and garbage patrols.

2. Road maintenance savings.

3. Manpower cost savings.

You must do a thorough job of checking road management areas. The areas have biological, social and economical implication. They reduce the risk of overkill in low recruitment years.

Tom Leege - Idaho: The state's road closures are primarily relating to elk. The emphasis is to develop roadless areas which contain prime habitat. There is an urgency to get timber, the roads are built for timber harvest, and the costs of damage should be borne by the land management agency.

There is a need for more authorization to assist in the enforcement of road closures. Make an attempt to get users to log or otherwise use the road when wildlife is not using the area. Livestock has an influence on use by wildlife since roads open up areas to use by livestock. Suggestions: Don't disrupt movement patterns more than necessary. Seed back with white dutch clover. Treat slash to eliminate barriers to movement of animals. A physical barrier at the closure such as concrete or dirt is more effective than gates. Submit a list of areas important to wildlife and ask the Forest Service to give due consideration to leaving them roadless. Build a lower standard road with no access to hunters from the beginning. Seed the road, provide permanent barriers and no admittance for 15 years.

John Mundinger - Montana:

Overview

The Forest Service administers 18% of the land area in Montana on which there are 30,000 miles of roads, 5 times the amount included in the highway system managed by the state. We must offer a reduced level of recreation if we cannot curtail road building, because of the increased efficiency of harvest. An elk logging study indicated that open roads reduce habitat use seriously.

Policy

Current road densities are enough. When any new road is opened, the agency is asked to close a like amount.

Open road mileage must be reduced.

Monitor road density.

If mature bull harvest is 40% or less during the first week, road density is not too high. Over 40% dictates serious restriction.

The area closure concept is being used in Northwest Montana, designating certain roads and drainages open, all others closed, but there is not enough law enforcement and cases need to be made public. Over 75% compliance from hunters was attained with minimum law enforcement.

If the road is needed for timber sale administration or other legitimate use, it is left open to everybody.

Make press releases well in advance of hunting season plus a blitz immediately before the season.

Four Forest Plans avoided the issues of the Department raised about roads. The Forest Service stands between us and recreation targets.

The closer to a managed forest situation the more important the intensity of roads. High areas give better escapement.

Panel on Quality in Deer Management

Idaho

Quality is equated with beauty. It is a perceived, not seen, quality.

Supply and demand dictate seasons.

It is a developed taste, depending on where the hunter is and what he has developed into.

Sampling hunter preferences is important.

The opportunity to hunt and see wildlife is what most people want to maintain.

The Department should provide a wide diversity of management. Diversity is the key to quality management.

Oregon

The people are saying we need four-point areas for quality. In Southeast Oregon several four-point areas are in effect. Steens Mountain includes four-point regulations.

Buck ratios have recovered with four-point management (35/100 does) and number of deer per mile counts are up.

After the 1975 initiation of antler class by point, four-point percentages dropped drastically as shown by post season herd composition. Harvest dropped off drastically, hunter numbers took a dip, then picked up again. Illegal kill went up because of too many people. When limited entry permits were adopted, the illegal kill dropped.

Limited entry, four-point or better areas are very popular with the hunting public. But we can't handle the number of hunters we have now if too many areas are four-point only.

The landowner preference system, providing a preference permit to landowners with over 40 acres, is in effect in permit areas.

Colorado

The concept of quality is based on a symbiotic relationship and is philosophical.

We have an obligation to enforce and encourage quality. Colorado has many anti-hunters.

Quality hunts embody limitations and are low success rate seasons.

They generally are in high country and/or wilderness areas for a limited number of hunters and licenses.

Features of demand we can monitor are buck/bull escapement by buck/doe and bull/cow ratios post-season.

Added quality can usually be attained by climbing 1,000 ft. and leaving the road 1 1/2 miles.

Arizona

In 1970 the Legislature told the Director that if he wanted a budget, to get rid of a lot of deer hunters. The unit by unit permit system was developed and hunter numbers dropped from over 90,000 to less than 70,000 deer hunters. Deer hunter success dropped to 16%.

We are now back to providing the maximum number of hunters that the resource can support. Last year there were 82,000 permits, this year 90,000.

The permit system is very popular. The key is a reasonable management goal and control over hunting pressure and harvest. The number of permits depends on the number of bucks wanted to be harvested and the maximum number of hunter days you can provide.

The Kaibab is divided into sustained yield and quality areas.

There is a movement to be more conservative.

Ecological Framework for Deer Management
By Henry L. Short
(J. Forestry, April 1972, pp. 200-203)
Summary by Don Zeigler

In the paper, Dr. Short discussed managing forests to produce optimum deer habitat and managing deer herds to make the most efficient use of the habitat.

He discussed the amount of energy required to maintain different age and sex classes of animals on winter range. For example - about the same amount of energy may be required to maintain a 45 kg lacating doe as a 60 kg buck or a growing 20 kg fawn.

The point being that the different age and sex classes comprising a herd may consume similar amounts of energy but represent totally different biomasses.

So management of a deer herd by regulation of its sex and age classes can therefore affect the efficiency with which the gross energy present in a plant community is utilized.

Not all animals convert energy into biomass at the same rate. In domestic animals, sheep are more efficient at converting forage to flesh than cattle.

In deer, yearling animals are much more efficient at converting forage into biomass than deer that are older than 2 years. According to Dr. Short, each kg of flesh gained by a 2 year old buck results from about 50 percent more food than it takes to put a kg of flesh on a yearling buck.

In terms of management, Dr. Short is saying we have two basic options, early age or late age harvests.

Early age harvest are regulated so that most animals are killed when they are relatively young.

In late age harvest, the animals are harvested after they have reached maximum development. In selective late age harvesting, animals with large antlers can be allowed to mature.

In early age harvests, the animals are harvested after they have reached maximum development. In selective late age harvesting, animals with large antlers can be allowed to mature.

In early age harvests, at least 40 percent of the yearlings and older animals are killed each year.

In theory, herd under early age management can consume about 30% less forage and produce only 5 percent less biomass that the same herd management for old age.

These types of management won't work equally well in all habitats or areas. One of Short's recommendations for public lands was "Where sport hunting is a management objective and where hunting pressures are very high, such as in many national forests, the deer herds should be managed for early-age harvest. This form of management, with its liberal kill regulations, maximizes the return in deer numbers and flesh per unit of forage consumed."

He also points out that "Trophy deer are expensive--production of four and five year old trophy bucks requires as much quality food and available energy as that of 11 sexually mature two year old bucks of good sporting quality. Thus, whether the return is good will or a hunting fee, a very high value must be placed on trophy deer if late-age harvest are to be justified."

Discussion

Cut back on number of hunters to keep illegal kill down.

Any elk is good, hunters won't pass up a bull, no selection takes place. A quality bull is a mature bull.

Allow herd growth.

People endorse the idea of fewer hunters to complete with as much as having a larger animal to harvest.

Diversity is an important measure of quality.

Be responsive to what people want to have and the Department wants to achieve. Listen closer, be more receptive.

SECTION V - APPENDIX

Appendix A. Mule Deer in Alberta

Current population 70,000 - 75,000

- Range from Alberta-Montana border north to Wood Buffalo Park.

- Greatest concentrations in foothills (densities range from 4 - 57/m in critical habitat; 15,000 animals total) and prairie ecoregion (mean 2.2/m ; 40,000 animals total) found generally along river systems and associated coulees (i.e., Red Deer, Oldman, Bow, South Saskatchewan Rivers).

- Also found in Aspen Parkland - central part of province.

Habitat has been good in general over the last few years - minor losses to forestry, agriculture and gas and oil exploration - quality of prairie habitat comparatively poorer early in season last 3 years due to spring drought conditions. However, habitat quality seems to be sufficient to provide opportunity for an increase in mule deer densities.

Management

Mule Deer Species Management Plans currently being developed in conjunction with a wildlife policy that was approved in the fall of 1982.

- No active habitat development programs for mule deer - some influence over forestry cutting.

- Minor influence of Buck for Wildlife program, Pheasant Raise and Release Program and irrigation programs of Department of Agriculture.

Hunting Regimes

Province divided into 15 Big Game Zones of similar habitat type. Each Big Game Zone further subdivided into Wildlife Management Units; 152 hunted. 1 Provincial Park and 1 Federal Military reserve also special hunting seasons of same duration within Big Game Zones as much as possible.

a. General Seasons - for males only with antlers ≥ 4" in length; generally 2.5 months in length, includes rut; implemented in northern and foothills areas where access is poor and animal vulnerability is low (i.e., most of province north of Red Deer River) limited general female seasons 10 days in length.

   - There were approximately 60,000 mule deer licenses sold in 1982.

b. General "trophy" seasons - in prairie and aspen parkland regions where deer vulnerability is highest.

3 weeks in South Central areas.

1 month in parkland.

c. Male Authorizations - authorizations open to residents only - distributed by random draw.

- Provides additional hunting opportunity to general license.

- Only validated by possession of general license; free to applicant.

- Used in areas of extreme hunting pressure and high deer vulnerability (i.e., Kananaskis Country southwest of Calgary and extreme southern-most part of province.

1175 licenses in 1982.

2835 applicants, 41.4% success on applications.

2 month season.

d. Antlerless Authorizations - for residents only and by random draw - to applicants - for females and males with antlers less than 4" in length.

- Issued in 42 WMU's for mule deer to control both hunter numbers and harvest.

- 5,100 licenses available.

- 11,776 applicants, 43.3% success on applications.

e. Special License - open to everyone - hunt takes place at Camp Wainwright which is a federal military base - licenses cost $20.00 and are selected by random draw.

- Hunter can shoot male mule deer and either sex of whitetail. 2 deer limit, only 1 of which can be female whitetail. Four three day seasons, 130 licenses per season.

f. Bowhunting - 3 bow only zones with a 3 month season in each.

36 WMU's with pre-rifle bow season.

2 - 4 Weeks.

Any age, any sex.

Survey Procedures For Mule Deer

- Usually carried out as part of a general ungulate survey.
- Conducted on known winter range.
- Areas receiving high hunting pressure are surveyed on a bi-annual minimum.
- Surveys take place in December and January, before antler drop so animals can be classified.
- All animals are counted and sexed when possible.
- One-quarter mile transects are flown over prairie blocks or in riparian habitat - same areas done each survey.
- Three man provincial survey team used until 1981, when it was replaced by regional crews.
- Fixed wing and rotary wing aircraft utilized.
- Surveys and harvest quotas must be completed in time to have Game Hunting regulations in place for the following season by March 30, and the hunting synopsis to the public by July 1.

Special Mule Deer Survey of Red Deer River

- Total area of approximately 75,000 square miles.
- Blocks established in 1977-78.
- Potential wintering areas mapped from landsat imagery in the 0.8 to 1.1 micrometer band (green, red and infra-red) taken in July 1974, August 1975, and August 1976.
- 20 Prairie blocks established and 13 blocks along the Red Deer River.
- Critical areas plotted on 1:250,000 maps; defined more accurately on aerial photos and ground truthed.
- Found 2.2 deer/mi on prairie sites (291 mi) and 8.6 deer/mi on Red Deer River sites (137 mi).

Harvest

Alberta's harvest data on deer and moose has been unreliable since 1979 when a voluntary questionnaire was discontinued.

- No compulsory registration on mule deer.
- Early questionnaires indicated a hunter success of 25-40%, depending on area surveyed.
- At 60,000 licenses per year we are legally harvesting from 12,000 to 15,000 mule deer per year. Illegal kill likely equals legal harvest in some areas.
- Native harvest an unknown entity. Natives have unlimited access to game animals on unoccupied crown land.
- Harvest limits are based on a 20% population harvest at approximately 25% of the previous year's license sales.
- The basic problem with the general license system used for mule deer is that there is no control on the number of hunters in the field nor the number of antlered animals that are taken.
- In areas where hunting pressure is high, trophy restrictions have been placed on males.
- Antlerless mule deer are all hunted under a draw system with the exception of bowhunters in bow only zones.

Appendix B. Deer Status Report -- Arizona 1983

The situation of Arizona's deer herds can be described as favorable. Precipitation has been above average in 4 of the last 5 years. This and the fewer incidences of drought have resulted in better than average desert mule deer and white tailed deer fawn survival. Precipitation and drought have been shown to be the primary factor that determines fawn survival of these species in Arizona and hence, their population levels.

Rocky Mountain mule deer survival in Arizona has also been good -- thanks to a recent history of moderate winters. Should these deer herds continue to enlarge, "any" or "antlerless" deer hunting may be desirable in the next year or two. This is especially so on the North Kaibab -- Arizona's legendary deer factory.

The improved status of our deer populations is reflected in the hunt statistics. In 1982, 71,123 hunters took 8,958 Rocky Mountain mule deer, 3,227 desert mule deer, and 3,967 whitetailed deer for a statewide hunt success of 23%. This was the highest hunt success and number of deer taken since the institution of permit only hunting in 1970. More permits -- 82,785 -- were authorized in 1982 than in any year since 1970 and more mule deer were reported taken than any year since 1975. More white tailed deer were bagged in 1982 than in any year in history.

The outlook for 1983 is bright. Surveys indicate another year of good fawn survival and 93,035 firearm permits are recommended for 1983 -- more than the 91,673 hunt applicants in 1982. Of course, local units will continue to be oversubscribed for the popular mule deer, and not all hunters will be able to hunt where and what species they wish. All hunters will have an opportunity to hunt, however. The institution of a $3.00 application fee and increased deer tag and license cost in 1983 will also result in reduced applicant pressure.

Appendix C. Rocky Mountain Mule Deer in British Columbia

Region	Population	Kill		Percentage of Kill		
		1981	1982	Male	Female	Fawns
2	2,500	180	195			
3	30,000	5,600	3,545	75	22	3
4	15,000	4,700	3,140	89	10	1
5	17,000	3,050	1,950	78	19	3
6	5,000	160	180	100		
7	4,500	1,020	365	93	5	2
8	25,000	3,800	2,500	88	10	2

The estimated deer population in British Columbia is 435,000. This includes 340,000 black tailed deer, 70,000 mule deer and 25,000 white tailed deer. We also have about 300 Fallow deer.

A variety of methods are used in making population estimates including: pellet group counts, kill data and density and area projections.

Appendix D. Mule Deer Management in Nevada

Harvest Estimates

Nevada uses a manditory hunter return card which is attached to the deer tag when issued. The penalty for failure to return is denial of big game tags in the succeeding year. Hunter return has averaged 95% for each of the past four years. Harvest data is then expanded to account for non-returnees. A program of checking observed versus hunter reported data for accuracy is presently being conducted. The intent is to firm up the expansion of tag data.

Population Estimates

Annual population estimates are prepared using a change-in-ratio (Selleck-Hart) based population model. Inputs are derived from herd composition samples of about 70,000 deer annually. Confidence intervals are fairly wide since variance in input samples has a cumulative effect in CIR estimates. Predictive accuracy is considered much better than the statistical precision of the estimates seems to indicate.

Research

The single formal research project is an effort to identify the cause(s) of population decline in a herd located approximately 150 miles north of Las Vegas on the Utah state line.

Informal investigations will continue to seek improvement in population estimation techniques now employed.

Current Status of Population

The 1982 Nevada spring mule deer population was estimated to be in excess of 140,000 animals. This represents an increase of 75% from the 1976 population which was the lowest encountered since the late 1940's. A sharp decline is expected in 1983 because of poor recruitment by both the 1981 and 1982 fawn cohorts. Herd composition surveys presently being conducted by helicopter indicate high over winter losses of 1982 fawns.

Management System

Nevada has operated under a full quota system since 1976. All regular season resident and non-resident tags are issued by drawing. Archery and muzzle loader seasons are also full quota. The accompanying table summarizes Nevada tag sales and reported harvests for the past 14 years.

Quotas are established based on estimated herd size and recruitment by management area. Herd estimates are derived using a change-in-ratio

based annual population model. Inputs for the model are obtained from semi-annual composition surveys using helicopters and manditory hunter report cards.

NEVADA DEER TAG SALES, REPORT CARD RETURNS AND REPORTED HUNTER SUCCESS

(1969 - 1982)

Year	Total Tag Sales	% Return of Hunter Report Card	Total* Reported Harvest	Reported Buck Harvest	Reported Antlerless Harvest	% Hunter Success For Bucks	% Hunter Success for Any Deer
1969	43,465	60	14,589	8,616	5,973	20	34
1970	43,038	58	15,043	10,895	4,148	25	35
1971	45,732	57	15,466	10,818	4,648	24	34
1972	50,652	65	16,223	11,811	4,412	23	32
1973	55,426	62	15,367	9,280	6,087	17	28
1974	51,100	57	12,802	7,453	5,349	15	25
1975	36,412	60	4,925	4,002	923	11	14
1976**	20,068	61	5,891	5,891	0	29	29
1977	23,972	75	8,423	8,423	0	35	35
1978	24,845	67	10,169	10,169	0	41	41
1979	23,293	95	11,000	11,000	0	47	47
1980	23,713	95	10,452	10,452	0	44	44
1981	24,755	95	13,686	13,594	92	56	55
1982	23,053	95	11,954	11,425	529	50	52
Average 1969-75	46,546	60	13,488	8,982	4,506	19	29
Average 1976-82	23,386	83	10,225	10,136	89	43	44
Difference No	-23,160	+23	-3,263	+1,154	-4,417	+24	+15
%	-50	+38	-24	+13	-98	+126	+52

* Harvest is based only on returns received during 1969-1975, harvest is expanded to account for non-returns from 1976 to present.

** Statewide quota hunting initiated.

Appendix E. New Mexico Mule Deer Report

Population Status

The 1980 population estimate was 278,000 deer. The five year trend from 1977 to 1981 is interpreted to be stable, based on winter sex and age counts (Table 1), random card surveys (Table 2) and field check (Table 3).

Current Management Systems

Winter Surveys

Surveys are conducted each year from December 1 through February 15. Sex and age are determined, and buck/doe and fawn/doe ratios are estimated. The surveys are conducted on foot, horseback, vehicle, snow machines, or helicopter. Helicopter surveys are done as much as is economically feasible. A minimum of 100 deer are classified in each game management unit where harvest exceeds 200 deer.

Browse Utilization

Browse transects are read annually in cooperation with the U.S. Forest Service and Bureau of Land Management. Transects are read in 27 game management units, based on harvest and subjective opinion of which units contain major deer populations. The number of transects varies from 5-25 per unit.

Hunt System

New Mexico adopted a stratified hunt system in 1975 and has used some configuration to limit number of hunters in the field at any one time, and to reduce the number of deer harvested. Both objectives were accomplished.

Each hunter must stratify his license at the time of purchase, for weapon type (rifle, bow or muzzleloader) and for one hunt strata. In 1982 stratified rifle seasons were split, north half and south half of the state, with two strat of 3 and 7 days each. The 1982 bow hunts were 14 days in September and 9 days in October. Bag limit for bowhunters was one buck with antlers at least two inches long in 3/4 of the state, and one deer of either sex in 1/4 of the state.

Significant changes for next year include a new license structure. In previous years, a big game license included deer, bear and turkey tags. Under the new structure, a license for each species must be purchased. The fees for most licenses have been increased and are expected to generate an additional $2,000,000 in revenue annually.

Table 1. Winter Sex and Age Counts.

	Bucks	Does	Fawns	Unclassified	Total	Male:Female: JU Ratio
1977-78	1,038	5,912	2,375	625	9,950	18:100:40
1978-79	641	4,020	1,785	667	7,113	16:100:44
1979-80	473	2,011	1,007	312	3,803	24:100:50
1980-81	601	2,576	1,172	291	4,640	23:100:46
1981-82	669	4,013	2,148	487	7,317	17:100:54
					$\bar{X}$	19.6 46.8

Table 2. Projected Harvest Data From Random Card Survey.

	Projected No. Deer Harvested	Projected Unit Hunter Pressure	Projected No. of Hunters	Percent* Hunter Success	Hunter Days Per Deer Harvested
1977	19,055	112,142	95,900	20.6	15.07
1978	19,860	113,048	97,948	20.3	14.09
1979	22,970	121,629	110,140	21.6	14.3
1980	19,725	-	100,511	20.1	-
1981	24,974	-	100,691	25.4	-

* Calculated from number of respondents, not projected numbers.

Table 3. Legal Harvest by Field Checks.

	No. Hunters Checked	No. Deer Harvested	Percent Success	Harvest Classification			
				AM	YM		Uncl.
1977	14,480	1,554	10.7	957	237		358
					Fork	Spike	
1978	8,080	864	10.7	381	302	115	66
1979	9,721	1,031	10.6	458	331	168	74
1980	11,758	1,212	10.3	468	403	250	91
1981	12,357	1,609	13.0	713	383	286	227

Table 4. Stratified Deer Seasons from Field Checks.

	No. Days/ Stratification	No. Hunters/ Stratification	No. Deer Harvested/ Stratification
1977	2/5/7	4,712/5,156/4,612 1/ (32.5)(35.6)(31.8) 2/	573/611/370 (36.9)(39.3)(23.8)
1978	2/5/7	3,123/2,766/2,191 (38.7)(34.2)(27.1)	333/309/222 (38.5)(35.8)(25.7)
1979	2/5/7 North	1,582/934/1,273 (16.3)(9.6)(13.1)	107/43/68 (10.4)(4.2)(6.6)
1979	2/5/7 South	1,948/3,029/955 (20.0)(31.2)(9.8)	349/372/92 (33.9)(36.1)(8.9)
1980	2/5/7	5,399/4,304/2,055 (45.9)(36.6)(17.5)	609/395/208 (50.2)(32.6)(17.2)
1981	3/7 North	2,183/2,383 (17.7)(19.3)	175/134 (10.9)(8.3)
1981	3/7 South	4,322/3,469 (35.0)(28.1)	865/435 (53.8)(27.0)

1/ Number of hunters.
2/ Percent of hunters.

Appendix F. Utah Mule Deer Status Report - 1983

Grant K. Jense

Big Game Program Coordinator
Utah Division of Wildlife Resources

Background

In order to understand the current status of mule deer in Utah today, it is necessary to briefly review what has happened to mule deer populations during the past 12 years. It was generally believed by game managers in the state that most of the deer herd units around the state were near optimum population levels going into the fall of 1972. However, during 1973, mule deer populations in Utah started into a sharp decline as did most deer populations in the Western United States. The cause for this decline are perhaps many, and interactions between the different factors are complex, but some principal causes can be isolated.

1. SUMMER DROUGHT CONDITIONS. Drought conditions started in 1971 and worsened in 1972. Growth on browse species was poor and grass and forb species suffered even greater. Thus the amount of forage and deer condition were below average going into the winter of 1972-73. 1974 and 1977 were also years of drought. In some areas, dead browse and grass plants were very evident.

2. SEVERE WINTERS. The winter of 1972-73 started in October and record breaking low temperatures and above average snow accumulations resulted in a winter that was very detrimental to deer. Late spring snows during May and June, 1975 took a heavy toll on the fawns in South Central Utah. The winter of 1978-79 was as severe as on deer as was the winter of 1972-73. An ice storm combined with above average snow accumulations in the eastern portion of state resulted in more losses in 1979-80. Records for snow fall were broken during the winter of 1981-82 in the northern half of the state, resulting in above average losses of deer with heavy losses being sustained in several important deer winter areas. Conditions during the past winter have been mild in Utah. However, central Utah has received large amounts of snowfall during March and April of this year. There are indications that losses will be substantial in a few areas.

3. ANTLERLESS HARVEST. Antlerless harvest exceeded 40% of the legal harvest on several units during the early 1970's due to shifting of hunting pressure because of more restrictive hunting in the northern portion of the state.

4. HABITAT LOSS. Habitat loss is more subtle than extreme weather patterns; however, it has a long lasting effect and compounds the effects of weather due to decreasing cover and forage availability. Highway construction, urban sprawl, mineral exploration and development, increased truck traffic associated with various transportation corridors, etc., all have their impact on mule deer winter range and cause added stress during an already stressful period of the year.

In summary, weather patterns and a variety of other factors during the past 12 years have not been very condusive to the production and survival of deer in Utah.

Management Strategy

To help reverse the decline in deer populations, a large portion of the state was restricted to buck only hunting in 1974. The entire state has been under a regular license, buck only hunting regulation since 1975. The only antlerless removal since 1975 has been on control permits.

Control permits have been used in Utah since 1934 to aid in balancing deer populations with available forage and to assist in alleviating crop damages on private property. Numbers of control permits authorized have varied considerably since 1934, with over 40,000 in 1962.

Since the decline of deer populations in the 1970's, most control permits have been antlerless only and have been authorized by the Board of Big Game Control for the purpose of controlling depredation on private property. Under this situation, it has been found that antlerless permits are far more effective than hunter's choice permits. There is a tendency for people to spend more time afield under the often crowded hunting conditions of a control hunt and to harvest fewer animals when hunter's choice permits are authorized, due to hunters spending their time seeking bucks.

Current Status

The general, buck only hunting season combined with antlerless control permits has substantially reversed the decline of the 1970's even with the set backs during the winters of 1978-79, 1979-80 and 1981-82. We have much more control of hunter distribution and antlerless removal now than when hunter choice harvest was authorized for regular license hunts. Much of the central portion of the state is near optimum population levels. The eastern and southern portions, which suffered the heaviest losses during the 1970's, have shown good progress during the last few years. Fawn productivity and survival on these units have improved the last few years (Table 1). The northern portion of the state, which had a set back during the winter of 1981-82, has a good breeding base herd which is generally very productive, and should respond to current management practices. Some of the northern herds

were reaching population levels that exceeded optimum levels. Management of these herds is being hindered due to lack of public hunting access. Private hunting clubs are becoming a concern to game managers.

There are still four or five management units which have not shown much response to the buck only hunting regime. Populations in these units reached such a low level that legal harvest, poaching, predation, accidents, etc., are keeping these herds below the threshold level they have to reach that will enable them to reproduce enough fawns to overcome the limiting factors.

Regular License Harvest

A record number of buck deer were harvested during the 1981 season (Table 2). The high harvest was probably due to a combination of improving deer herds over most of the state, increased fawn production and survival up to the deer season (preseason counts) and excellent recruitment of the cohort due to a very mild 1980-81 winter. The record harvest is not necessarily a reflection of high deer population. Checking station data showed that as much as 80% of the buck harvest on some units were yearlings, indicating the magnitude of the yearling cohort.

The 1982 harvest dropped 6,502 bucks, as expected, due to the large loss of yearlings in the northern portion of the state. Improving herds in the remainder of the state decreased the magnitude of the total decrease in the 1982 harvest. License sales and hunters afield increased, primarily due to improving hunter success. Non-resident license sales are starting to increase again after a 214% decrease from 1972 to 1980. There is presently a limit of 20,000 licenses for nonresidents. However, that limit has never been reached since it was imposed in 1975, with 11,202 being sold in 1982.

Control Permit Harvest

Control permit harvest has been fairly stable the past three years (Table 3) with an average of about 10,300 antlerless deer being harvested each year. The need for antlerless removal is likely to increase the next few years due to improving deer herds over almost the entire state.

Primitive Weapon Hunts

Archery

Archery permit sales have fluctuated between 15,000 and 26,000 during the past 12 years (Table 4). The fluctuations have been caused by limiting the hunter to buck only hunting, removal of the archery permit tag some years (if a hunter was successful, he would have to use his regular license tag) and an increase in permit fees from $5 to $10.

Hunter success decreased by more than half when permittees were restricted to buck only and had to use their regular license tag. Since herds have improved and the archers have a tag with their permit again, hunter success is nearly approaching the success obtained during some years with hunters choice seasons.

Muzzle-Loader

Since the inception of muzzle-loader deer hunting as a separate hunting season in 1973, the Board of Big Game Control has had a constant struggle with trying to meet the requests of the various interest groups. Archers do not want them hunting during their season, livestock owners do not want one more hunt to disturb their stock and elk and deer hunters do not want them disturbing the game on their favorite hunting area prior to the general season. As a result, the Board has intentionally tried to limit the number of blackpowder hunters by requiring them to purchase a permit before the regular deer season, use their regular license tag and hunting in early November prior to the rut but just after the season closure of the general deer season. Data in table 5 indicates that the season structure and regulations has almost stabilized the permits sold without a quota. The large difference in the permits sold and hunters afield, indicates the number of permitees that used their tag during the general deer season and therefore were not able to hunt during the muzzle-loader season.

Future

At present, we are optomistic about the status of our deer herds in Utah. At least in the near future, we will continue to use a buck only hunting regime with antlerless control permits to build herds, stabilize some populations and alleviate crop damage.

We are in the process of completing herd unit management plans for all 60 of our deer management units (examples are attached). These plans will contain the data and recommendations for management strategies that will be presented to the Board of Big Game Control for setting of hunting season and solving problems associated with each unit.

Table 1. PRESEASON DOE/FAWN RATIOS

(Expressed as fawns per 100 does including yearlings)

Year	Statewide	REGIONS					
		Northern	Central	Northeastern	Southeastern	Southern N. End	Southern S. End
1964	97	74	75	98	121	76	70
1965	63	73	—	83	70	37	51
1966	84	42	88	101	105	65	85
1967	83	75	86	95	83	82	74
1968	83	90	74	93	79	96	69
1969	81	88	98	76	77	87	70
1970	83	74	76	82	87	83	87
1971	84	78	106	76	84	80	80
1972	75	71	91	67	74	73	87
1973	71	76	78	64	71	73	68
1974	75	81	84	74	74	75	64
1975	73	87	89	68	81	51	63
1976	86	100	107	78	80	85	63
1977	74	92	91	70	59	72	67
1978	78	97	95	75	60	75	63
1979	80	95	95	71	61	80	74
1980	82	94	96	70	70	80	75
1981	86	94	95	79	78	86	82
1982	85	73	100	81	87	76	82

Table 2. UTAH REGULAR SEASON DEER HARVEST 1971-82.

Year	Licenses Sold	Hunters Afield	HARVEST Antlered	HARVEST Antlerless	Total	Percent Success
1971	200,966	185,105	62,924	31,351	94,275	50.1
1972	214,089	197,173	68,712	34,351	103,063	52.3
1973	218,056	198,726	51,587	30,732	82,319	41.4
1974	204,976	187,711	45,306	7,537	52,843	28.2
1975*	196,431	177,056	41,356	--	41,356	23.4
1976*	181,663	169,705	55,516	--	55,516	32.7
1977*	195,030	187,752	65,669	--	65,669	35.0
1978*	203,709	193,108	63,549	--	63,549	33.0
1979*	203,220	188,067	57,210	--	57,210	30.4
1980*	200,643	186,381	62,416	--	62,416	33.5
1981*	199,947	187,598	76,634	--	76,634	40.9
1982*	205,684	193,842	70,132	--	71,132	36.2

*Buck only hunting on regular license.

Table 3. CONTROL PERMIT HUNTING, 1971-82.

Year	Permits Sold	Hunters Afield	HARVEST Buck	HARVEST Doe	HARVEST Total	Percent Success
1971	2,155	1,876	557	607	1,164	62.0
1972	4,016	3,391	1,085	1,027	2,112	62.3
1973	2,170	1,841	435	315	750	40.7
1974	1,179	1,103	169	254	423	38.3
1975	6,103	5,869	1,064	1,667	2,731	46.5
1976	300	276	38	95	133	48.2
1977	1,650	1,359	222	751	973	71.6
1978	5,012	4,750	55	3,085	3,140	66.1
1979	9,125	8,580	121	5,387	5,508	50.7
1980	15,650	14,388	--	9,796	9,796	68.1
1981	15,050	13,706	--	10,182	10,182	74.3
1982	16,585	15,531	29	10,890	10,919	70.3

Table 4. ARCHERY PERMIT HARVEST, 1971-82.

Year	Permits Sold	Hunters Afield	HARVEST Buck	HARVEST Doe	HARVEST Total	Percent Success
1971	18,480	18,276	1,913	1,423	3,336	18.2
1972	20,564	20,047	1,832	1,409	3,243	16.2
1973	25,832	25,156	1,961	1,540	3,501	13.9
1974*	16,648	16,218	807	560	1,367	8.4
1975**	18,820	17,625	1,314	--	1,314	7.5
1976*	15,022	14,443	874	--	874	6.0
1977*	15,535	15,054	1,217	--	1,217	8.1
1978*	17,819	17,284	1,400	-	1,400	8.0
1979+	23,896	22,201	2,753	--	2,753	12.4
1980+	18,362	17,680	2,621	--	2,621	14.8
1981+	20,975	19,646	3,095	--	3,095	15.8
1982+	24,356	23,667	3,656	--	3,656	15.4

*Archery permit did not have a tag - regular license tag had to be used.

**Archer permit had a tag - buck only hunting.

+Buck only hunting - permit had a tag - could fill archery permit tag and regular license tag during archery season using archery tackle.

Table 5. MUZZLE-LOADER DEER PERMIT HARVEST, 1973-82.

Year	Permits Sold	Hunters Afield	Hunter Days	Harvest Buck	Harvest Doe	Harvest Total	% Succ.
1973	467	445	1,416	35	37	72	16
1974*	383	356	1,202	28	--	28	8
1975	760	731	2,764	86	11	97	13
1976*	1,562	1,513	5,199	250	--	250	17
1977*	2,486	2,298	7,782	278	--	278	12
1978*	2,119	1,809	5,976	193	--	193	11
1979*	4,056	3,279	11,532	792	--	792	24
1980*	5,229	4,093	16,212	407	--	407	10
1981*	5,121	4,223	16,731	898	--	898	21
1982*	5,883	4,795	19,572	1,277	--	1,277	26
Total	28,066	23,542	88,386	4,244	48	4,292	18

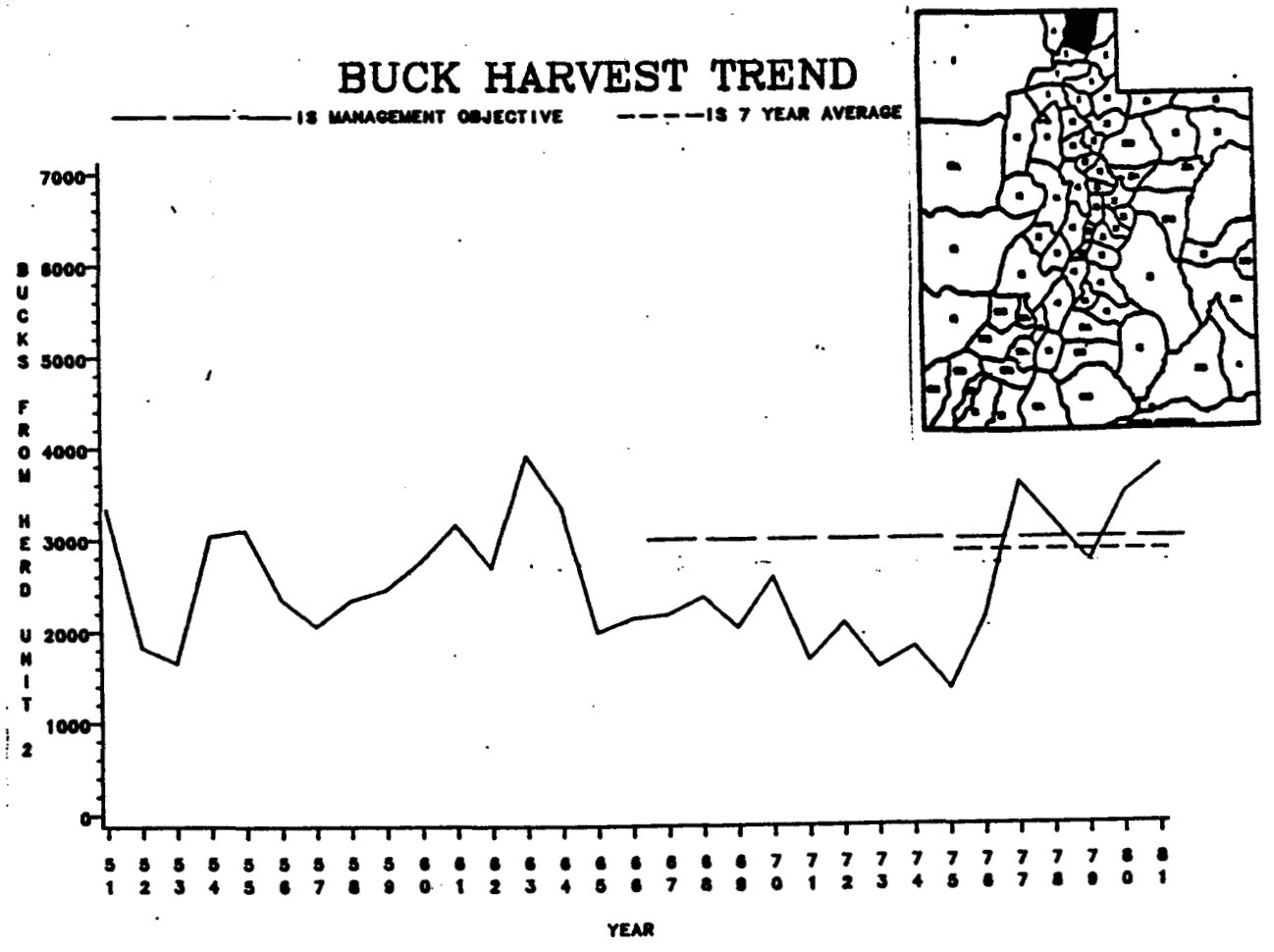
*Buck only.

* * * MANAGEMENT PLAN SYNOPSIS * * *

Deer Herd Unit #2 — Cache

Status: Range condition is spotty, some areas are in good condition others in poor condition. Winter mortality was heavy on this unit last year. Fawn production remains good to excellent. Hunter numbers have been increasing since 1979.

Management Objectives:
1. Stablize at a harvest of 3,000 buck deer per year.
2. Maintain 29,500 acres of deer winter range in good condition.



Problems & Strategies: Agriculture damage.

-Instigate antlerless removal during the regular hunt when damage situtations arise and range conditions are depleted. Secure and maintain the retaining fence between Logan and Blacksmith Fork Canyons.

-Loss of deer winter range to housing and recreational developments.

-Make a concentrated effort to increase the access to private lands and increase antlerless harvest in specific areas. Investigate the alternative of a winter feeding program in this area.

RANGE AREA AND APPROXIMATE OWNERSHIP*

Ownership	Summer Range Area (acres)	%	Winter Range Area (acres)	%

*Ownership data unavailable at time of publication.

HARVEST TREND SUMMARY

Year	Type of Hunt	Season Type	Season Length	Hunters Afield	Harvest Buck No.	Buck %	Antlerless No.	Antlerless %	Total	% Suc.	Permits Auth.	Permits Sold
1977	Con.	13ad	4	73	0	0	71	100	71	97	100	100
	Reg.	2	11	11,612	3,594	100	0	0	3,594	31		
	Total				3,594	98	71	2	3,665			
1978	Con.	2ab	11	175	0	0	104	100	104	59	200	187
	Reg.	2	11	9,783	3,153	100	0	0	3,153	32		
	Total				3,153	97	104	3	3,257			
1979	Con.	2ab	11	569	0	0	426	100	426	75	600	599
	Reg.	2	11	9,331	2,721	100	0	0	2,721	29		
	Total				2,721	86	426	14	3,147			
1980	Con.	2ab	11	229	0	0	198	100	198	86	250	250
	Con.	2ab	11	1,038	0	0	747	100	747	72	1,100	1,100
	Con.	13ad	4	186	0	0	107	100	107	58	200	200
	Reg.	2	11	10,234	3,313	100	0	0	3,313	32		
	Total				3,313	76	1,052	24	4,365			
1981	Con.	2ab	11	331	0	0	276	100	276	83	350	350
	Con.	2ab	11	1,016	0	0	774	100	774	76	1,100	1,100
	Con.	13ad	4	187	0	0	139	100	139	74	200	200
	Reg.	2	11	11,699	3,773	100	0	0	3,773	32		
	Total				3,773	76	1,189	24	4,962			

PRESEASON AND POSTSEASON CLASSIFICATION

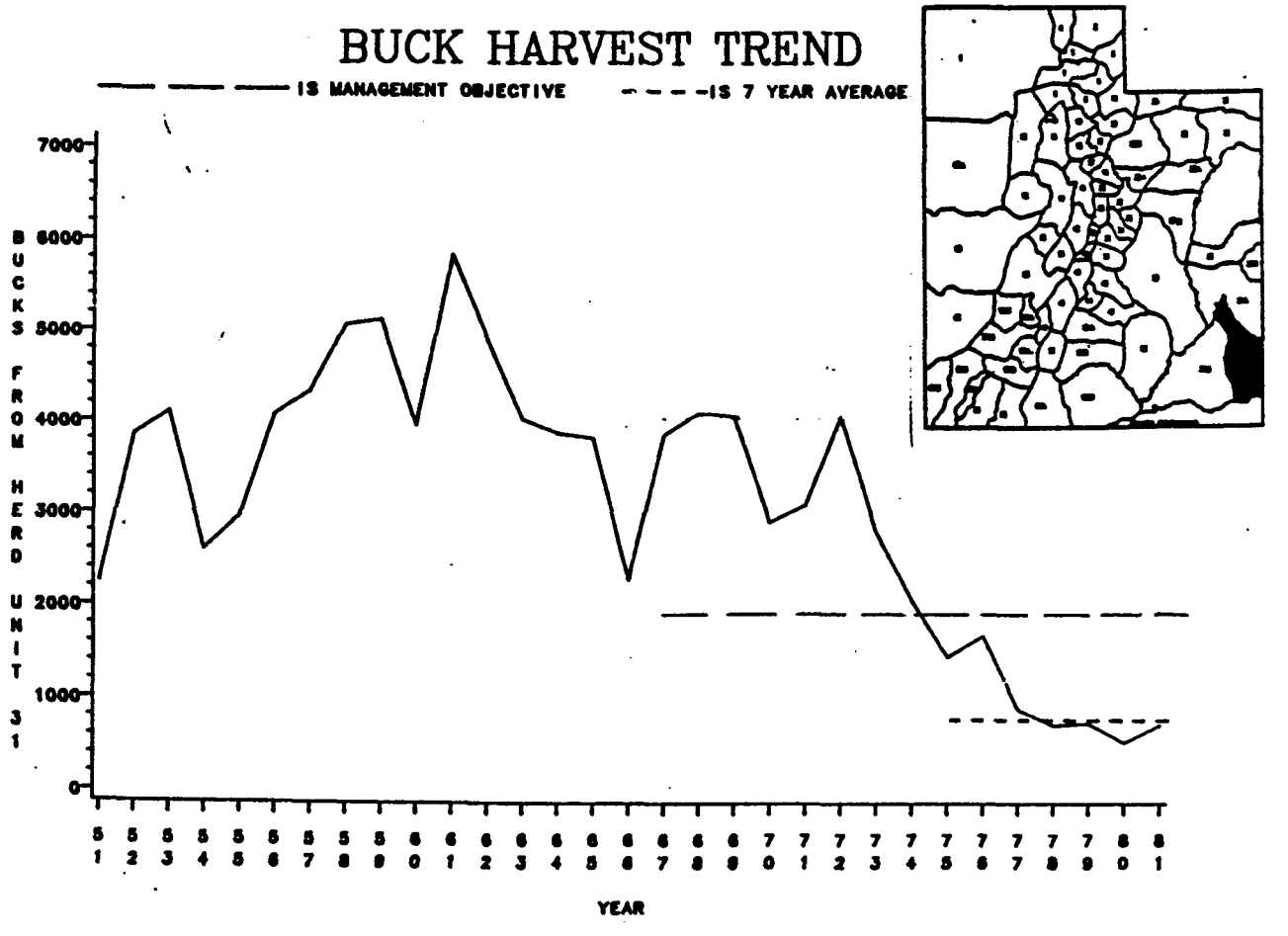
Year	Bucks Pre	Bucks Post	Does Pre	Does Post	Fawns Pre	Fawns Post	Total Pre	Total Post	Fawns/ 100 Does Pre	Fawns/ 100 Does Post	Bucks/ 100 Does Post
1971	148		218		161		527		74		
1972	48		89		63		200		71		
1973	89		163		106		358		65		
1974	48		84		68		200		81		
1975	77	47	203	181	193	158	473	386	95	87	26
1976	83	15	176	67	162	77	421	159	92	115	22
1977	108	4	212	37	192	72	512	173	91	74	4
1978	35	36	161	365	137	296	333	697	85	81	10
1979	61	27	293	134	295	114	691	293	101	85	20
1980	35	4	65	123	63	104	163	231	97	85	3
1981	47	14	201	300	191	229	439	543	95	76	5

* * * MANAGEMENT PLAN SYNOPSIS * * *

Deer Herd Unit #31A — San Juan - Blue Mountain

Status: Winter range is in good condition. Deer winter mortality is believed to be minimal. Fawn production is fair. Harvest numbers showed a slight increase last year, hunter numbers a slight decrease.

Management Objectives: 1. Maintain a harvest of 1,900 buck deer annually.



Problems & Strategies: Low deer numbers, productivity below long term average, slow response of deer herd to buck only hunting.

-Two well thought-out investigations need to be done, one to determine if summer range is limiting and another to assess lion predation on deer.

Impacts of uranium mining and milling.

-Work close with Energy developing companies and land management agencies to coordinate disturbance with yearly cycles of deer. Wherever possible obtain mitigation for lost habitat.

RANGE AREA AND APPROXIMATE OWNERSHIP*

Ownership	Summer Range Area (acres)	%	Winter Range Area (acres)	%
Forest Service	95,900	98	69,100	8
Bureau of Land Management			465,800	52
Private	2,100	2	298,400	33
State			58,900	7
Total	98,000		892,200	

*Surveyed 1967; F. & G. Bull. 68-2.

HARVEST TREND SUMMARY

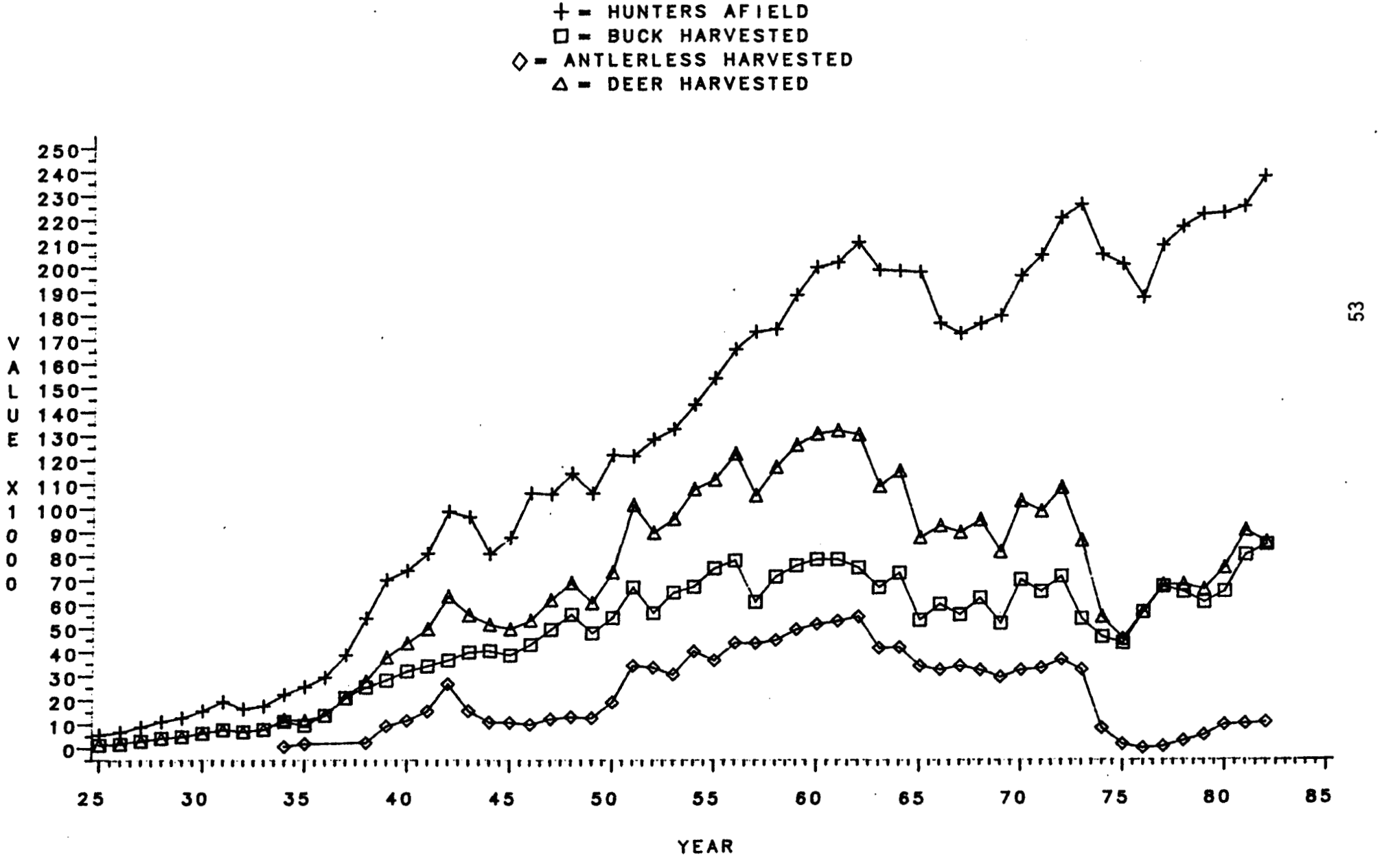
Year	Type of Hunt	Season Type	Season Length	Hunters Afield	Harvest Buck No.	Buck %	Antlerless No.	Antlerless %	Total	% Suc.	Permits Auth.	Permits Sold
1971	Reg.	1	11	5,107	2,010	62	1,229	38	3,239	63		
1972	Reg.	1	11	7,027	2,841	65	1,553	35	4,394	63		
1973	Reg.	1	11	5,288	1,931	60	1,321	40	3,302	63		
1974	Reg.	4	11	4,887	1,515	66	760	34	2,283	47		
1975	Con.	1b	11	489	116	36	210	64	326	67	500	501
	Reg.	2	11	3,395	917	100	0	0	917	27		
	Total				1,033	83	210	17	1,243			
1976	Reg.	2	11	3,166	1,036	100	0	0	1,036	33		
1977	Reg.	2	11	2,174	584	100	0	0	584	27		
1978	Reg.	2	11	1,913	534	100	0	0	534	28		
1979	Reg.	2	11	2,124	572	100	0	0	572	27		
1980	Reg.	2	7	1,839	538	100	0	0	538	29		
1981	Reg.			2,000	727					36		

PRESEASON AND POSTSEASON CLASSIFICATION

Year	Bucks Pre	Bucks Post	Does Pre	Does Post	Fawns Pre	Fawns Post	Total Pre	Total Post	Fawns/100 Does Pre	Fawns/100 Does Post	Bucks/100 Does Post
1971	92		122		136		350		111		
1972	80		268		266		614		99		
1973	78		214		214		506		100		
1974	161		353		327		841		92		
1975	29	37	153	272	165	286	347	595	108	105	14
1976	52	24	198	221	172	140	422	385	87	63	11
1977	77	39	382	302	264	202	723	543	69	67	13
1978	22	22	105	186	75	123	202	331	71	66	12
1979	50	21	168	117	86	66	304	204	51	56	17
1980	72	21	151	129	115	90	338	240	76	70	16
1981	155	28	208	182	153	129	516	339	74	71	15

UTAH DEER HUNT SUMMARY

(1925-1982)



Appendix G. Oregon Mule Deer Report

Mule Deer Status

The population in Oregon began to recover from the mid-70's slump in the late 70's with overall buck ratios of 15-17 bucks per 100 does and fawn ratios of 60-70 fawns per 100 does. Population trends approached 11 deer per mile but was still below the management objective of 11.8 deer per mile. However, poor fawn survival over winter in 1979 and 1982 started a declining trend for 1982 and 1983.

In 1982, buck ratios dropped to 12 bucks per 100 does and December 1982 fawn ratios were 48 fawns per 100 does. Nearly fifty percent of the fawns were lost in the winter of 1981-82 and the following year's fawn crop was poor.

Hunters were informed of the poor prospects to be expected in the hunting season of 1982 and as expected, hunter numbers dropped drastically. Averaged mule deer hunters in the late 70's numbered approximately 145,000 and 129,000 hunted mule deer in 1982. Buck harvest had run around 40,000 to 50,000 and dropped to 31,000 in 1982.

Presently, winter conditions appear to be mild and fawn survival should be good. However, many units did not have many fawns going into the winter and the feeling is hunting seasons will again be very conservative.

Oregon's hunting seasons have varied over the years. Presently a split tag is required; that is either Western Oregon or Eastern Oregon, but not both. Eastern Oregon (mule deer) has had a spike buck or better bag limit since 1980 while a forked horn or better regulation was in effect from 1975-79. Two management units were limited to four point or better and limited entry.

Mule deer hunting seasons in Oregon in recent years have been from 12 to 15 days long. In 1982, 20 management units had seven day buck seasons because of poor fawn survival and low buck ratios. The remaining 27 units had 12 day buck seasons. There are no hunter quotas in Oregon except in point regulated units.

In addition, Oregon has adopted a single weapon concept on bow hunting and muzzle-loader hunting. The hunter has to choose his weapon prior to the season and can only use that particular weapon to take an animal. The bow hunting season was 37 days in length prior to the rifle season. Statewide and either sex was allowed in the bag. Various late season opportunities were offered. Muzzle loader hunters were limited to a few management units and thier opportunity was after the rifle season.

Oregon's method of determining hunter success continues to be a hunter questionnaire mailed to license holders. Controlled hunt participants are sampled by report card. Approximately 10 percent of the general season rifle hunters and 10 percent of the bow hunters are sampled with a questionnaire mailed in January. A second mailing is made March 1st to those individuals failing to respond to the first questionnaire. Rate of return is approximately 60 percent.

In 1982, 129,089 mule deer hunters harvested 30,836 buck deer and controlled tag holders numbering 7,450 took 4,258 antlerless deer. Mule deer archery hunters numbered 11,160 and harvested 1,686 deer for an average success of 15 percent. Muzzle loaders harvested 297 mule deer.

A simple system of expanding basic census data into population models for early spring and again in the fall has been fully implemented for Oregon mule deer herds. The "models" were developed from a strong data base composed of trend counts, herd composition census from both fall and spring, hunting season take records, and a number of complimentary investigations. It is intentional that the models are updated each year by the observer, not a third party. There is provision for correcting faulty trend count results by using correlating fawn/adult ratio trends and harvest trends.

Quality Hunting Panel

Any discussion of quality hunting must start with a definition of quality. This is by far the hardest part of the discussion as quality means a wide variety of things to hunters.

Generally, when discussing the definition with hunters, the most common comments are 1) few hunters in the field, 2) good success rate, 3) bag a nice buck, and 4) be able to go hunting each year. However, these criteria conflict with each other when closely studied. Oregon has very few areas that limit hunters by access without a special regulation on hunter numbers. Presently, Oregon averages 140,000 plus mule deer hunters averaging 25 percent success with an every year opportunity.

In recent years, Oregon hunters tend to endorse four-point areas as quality hunting units. As buck ratios continue to decline, more pressure is felt to set aside units for four point or better bag limits. In 1975, Oregon adopted four-point regulations on the Steens Mountain Unit and I will discuss the effects of the regulation.

Buck ratios were low in the mid-70's, below 10 bucks per 100 does and the regulation has improved the situation significantly as expected. Buck ratios have ranged from 25 to 35 bucks per 100 does. No significant change was recorded in fawn production or survival.

Post season antler class information generally showed the four point buck population ranging from 30 to 40 percent of the total bucks. Since the regulation was adopted, the percentage of four points in the buck population has averaged 17 percent. The regulation focuses hunting pressure on the four-point buck segment and most of the bucks taken are younger four points with smaller antlers.

From 1975 through 1978, hunter numbers were unregulated. However, a harvest of 866 legal bucks in 1978 was also accompanied by an estimated loss of 140 illegally killed deer. The illegal kill included does and all age classes of bucks. In 1979, the Commission set a quota of 1,200 hunters on the unit as opposed to the 2,800 hunters in the unit in 1978. Illegal kills dropped sharply and hunter numbers have varied from 1,200 to 1,400 since 1979.

In summary, the regulation applies heavy hunting pressure on the four point buck segment of the population and eventually requires a hunter quota as the unit begins to attract more hunters.

MULE DEER WORKSHOP

Road Management (Panel)

In a decade, the Oregon program of cooperative road management to minimize vehicle use impacts on big game primarily, has reached 1.9 million acres in 52 project areas. Seven of the projects involve winter range only to provide necessary solitude for wintering elk and deer. Six projects provide vehicle use controls year round. The Forest Service, principal cooperating agency, has been asked to approve a "positive posting" system that identifies open roads with a green symbol and all other roads and cross country are closed to motorized equipment. Agreement on this approach to posting will save thousands in man hours and dollars.

Appendix H. Estimating Mule Deer Population Size and Harvest in Washington

In Washington, a big game investigations project was initiated in 1982 in an attempt to standardize management programs within the state. For statewide harvest estimates, hunter kill is used as a direct indicator of population size. Buck harvest is believed to be the best available measure of deer numbers. It is assumed that there are approximately 10 deer in the population for every buck harvested OR the buck harvest each year represents 10 percent of the post-hunt population. Laukart (1950) prepared a graph is estimate the number of deer left per buck killed. The graph showed that the post hunt population could contain 7 to 20 deer for each buck killed depending on doe/fawn and buck/doe ratios. These calculations were reiterated by Dasmann (1952) in a model that estimated population numbers from winter buck/doe and fawn/doe ratio counts to correlate with previous years and population estimates.

Mule deer classification counts are conducted just after the hunting seasons in December and January. Hiking surveys on predetermined routes in representative mule deer areas of Eastern Washington provide trend data as well as range condition and buck/doe/fawn ratios. Helicopter classification counts are conducted in the Methow Valley of North-Central Washington.

Don Zeigler conducted a deer study in the heart of our mule deer range from 1972 to 1975. Zeigler (1978) found buck harvest to be the best indicator of population trends in the Okanogan because of number of hunters, season lengths, and bag limits had changed little in the past 20 years.

Big game population estimates are very difficult for our clientele to understand or support. Because of this credibility problem, the Game Department has elected to address population numbers in terms of an index rather than a specific number.

For deer, the index is calculated by:

$$\frac{\text{Buck kill last 5 years}}{\text{Assumes 10 deer in population}} \text{ divided by 5 and multiplied by 10 -- for each buck killed.}$$

HARVEST

Statewide mule deer harvest is monitored primarily through the Game Harvest Questionnaire sent to 10% of license buyers each year.

During the 1950's and early 1960's, a follow up questionnaire was routinely sent to those individuals not responding to the initial questionnaire. In 1963, the Department of Game conducted a study to determine the impact of the follow up questionnaire on total game harvest data. This study found the greatest deviation occurred in the grouse and goose harvest. The deer and elk harvest estimate was 3 percent higher than the initial questionnaire when a follow up was included. Questionnaire study recommendations were to eliminate the follow up questionnaire and use a 3 percent correction factor to reduce the deer and elk harvest to the correct level. Study recommendations were adopted.

In 1979, another study of questionnaire accuracy was conducted as the survey return rate had been declining for several years. Return rate dropped from about 75% in the 1960's to slightly over 50 percent in 1979. The results of the study indicated the follow up questionnaire increased the return rate from 52 to 76 percent, but did not significantly affect statewide totals. The initial questionnaire was 0.7 percent high for deer and 0.6 percent high for elk. Variance in these harvest data was insignificant for the major species on a statewide basis. A noticable variance did, however, occur on some less numerous species such as snipe, chukar, partridge, rabbits, and rockchuck. This study concluded that a follow up questionnaire was unnecessary for statewide harvest information.

In addition, last year the Department of Game initiated a mandatory Game Harvest Report Card. If preliminary estimates are correct, we received report cards from 47.5 percent of the successful deer hunters. We received 19,807 deer report cards.

This year the Department is collecting harvest information from several sources and will compare numbers and names from one source of data with others. We will, for example, compare names of persons who reported taking a deer on a report cared with locker forms, the Game Harvest Questionnaire which samples 10 percent of our hunting license buyers (33,000 questionnaires for 1982), successful field bag checks, and telephone surveys. A cross check will be made to determine what percentage of successful hunters returned report cards. A detailed report will be prepared on our analysis of this harvest information. Our goal is to enhance the accuracy of harvest data on deer and elk while reducing the variety of sources from which these data have historically been derived (better information with less expenditure of manpower and money).