MONO LAKE DEER HERD MANAGEMENT PLAN

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INTRODUCTION

A long-term decline in deer numbers has occurred throughout California from the mid-1960's through 1975, prompting the Department of Fish and Game (CDFG) to formulate a general plan to restore and maintain healthy deer herds at levels compatible with their habitat, to increase the quantity and quality of deer habitats , and to provide for diversified recreational use of deer. In 1977 the Legislature mandated the Department via Assembly Bill 1520 (Perino) to develop plans for deer herd management units containing specific program elements, directing that a geographical unit of deer range will be considered distinct from adjacent ranges and that a management plan for that unit will be designed for that herd alone. This document complies with the Departmental policy commitment and legislative mandate to describe the status and trend of the Mono Lake deer herd and to formulate a management program to 1) increase overall deer numbers, 2) improve the condition of the range, and 3) provide for high quality and diversified use of Mono Lake deer.

To achieve these goals, this plan incorporates ecologically sound management concepts which provide the basis for specific program elements relating to herd size, production and survival, research needs, habitat preservation and improvement, harvest strategies, and other facets of herd management. Deer herds are continually changing, so herd plans must be dynamic. Study results and other additional information will allow plan revision and updating.

The herd range is largely public land, but both public and private lands are subject to heavy demands for multiple

commercial, residential and recreational uses. Most of these uses adversely affect the deer herd. This plan is intended to provide guidance to land management agencies and local governments when making resource allocations which will dictate the future of Mono Lake deer. There are several major issues and concerns involved in the management of Mono Lake deer, including: 1) high demand for multiple resource use on the range especially recreation, grazing, and housing, 2) increasing demands for water for power production and housing development, 3) demand for increased deer harvest and hunting opportunity, 4) long term deer habitat reduction and deterioration, and 5) opportunities for deer habitat preservation and enhancement in conjunction with other resource management programs.

These factors, in combination with appropriate laws, regulations and policies, were used in constructing goals for the Mono Lake herd. Since the attainment of these goals is a long-term process, this plan is intended to be effective for a period of 10 years with a target date for goals described as 1996.

DESCRIPTION OF THE HERD AND MANAGEMENT UNIT

Herd Definition and History

This herd is a population of Rocky Mountain Mule Deer which winter in Mineral and Lyon counties, Nevada, and summer in western Mono and eastern Tuolumne counties in California. The herd occupies an area of approximately 350 square miles, about 100 square miles of which are winter range, about 60 square miles are summer range, and the remaining 190 square miles are intermediate ranges.

Before settlement by European man, deer were scarce in the unit area, but increased slowly between 1910 and 1930 (see range history for details). Deer tags were first issued by the California Department of Fish and Game in 1927; only 36 deer were reported taken in Mono County in that year. Herds increased during the 1940's and 50's, stimulating high hunter success (Britton, 1971). By the late 1950's deer had increased to the extent they clearly exceeded the carrying capacity of the winter range.

The first antlerless hunts were held in 1955 to reduce excessive deer numbers. Tag quotas were set using the three-year average buck kill. It was felt that too few deer were taken to relieve winter range abuse. In the mid-1960's, the number of antlerless tags was increased; the higher harvest rate and the severe 1969 winter combined to reduce pressure on the range. In recognition of those population reductions, no antlerless permits have been authorized since 1967 to allow numbers to increase. Increases have been slow and the most recent data suggests a static population of about 3,000 animals at this time.

Seasonal Ranges and Migration

Winter range, summer range, and general migration corridors used by the herd are shown in Figure 1. Much information on the ranges and movement patterns of the herd are presently unknown.

Harvest History

Harvest data is available from 1957 to present. Total kill averaged 390 during the late 1950's and rose to an average of 448 during the 1960's. These figures include a substantial antlerless harvest.

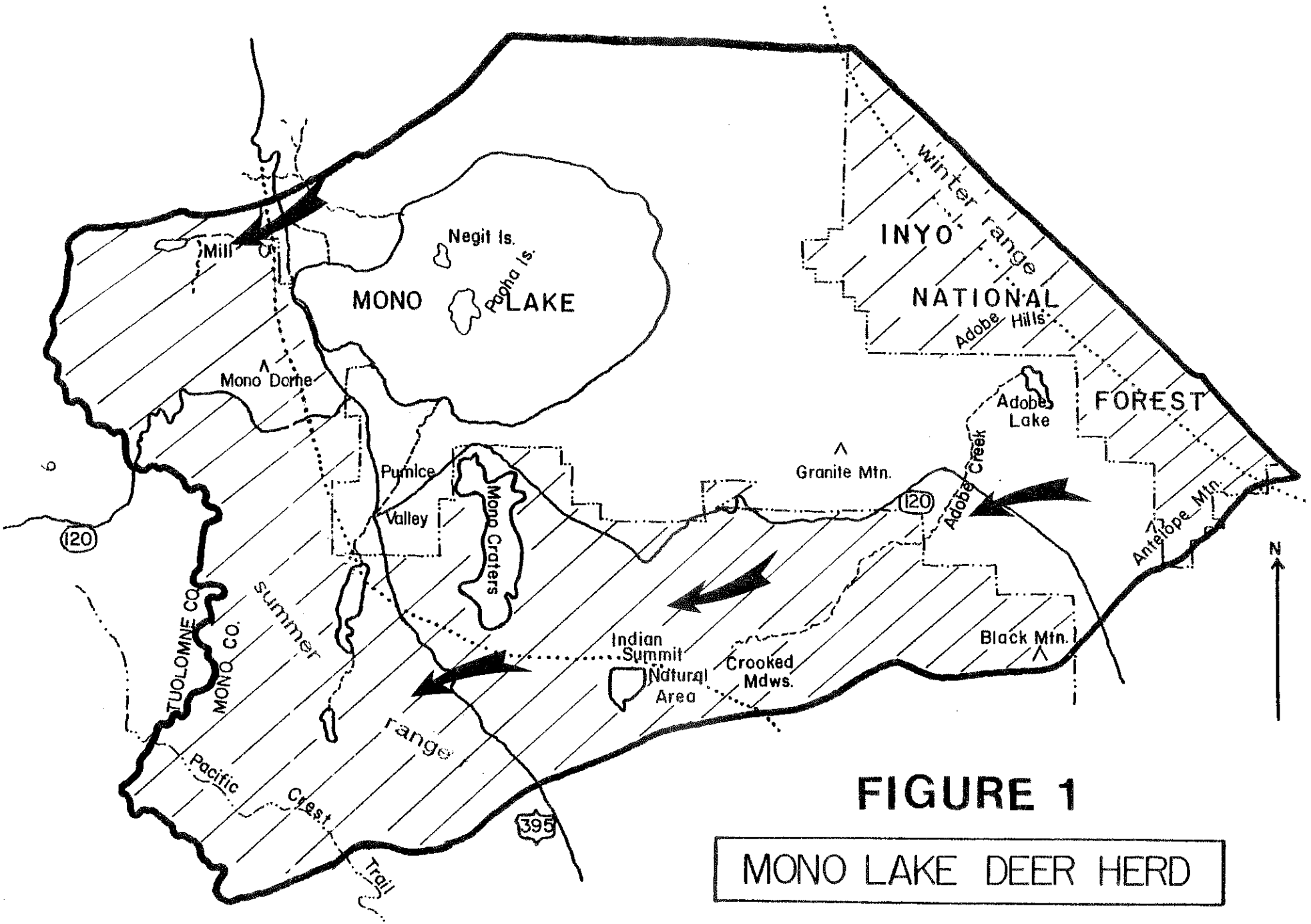


FIGURE 1

MONO LAKE DEER HERD

The harvest average fell to 169 during the 1970's due to a lack of doe harvest. Buck harvest has fluctuated widely over the years. Buck hunting seasons were set earlier and shorter during recent years, affecting the overall harvest (table 1).

In 1981, a storm occurred during the lenghtened (month-long) hunting season. This resulted in a high buck harvest because essentially all bucks became available to hunters. Subsequently, buck ratios were severely reduced and the 1982 harvest was reduced to a level consistent with the long-term average.

The 1982, 1983, and 1984 springs brought late inclement weather which delayed migration and provided abundant forage production. Many bucks, migrating late, remained at lower, accessible ranges where feed conditions were excellent. These bucks were more available to hunters than ususal. Due to superior feed conditions a high percentage of yearling bucks grew forked antlers. These young, inexperienced legal bucks were relatively easy targets and made up a high proportion of the harvests. (Of the bucks aged throughout the seasons about 65% were yearling forks). These factors created a situation favoring high buck harvests in spite of low buck ratios.

Herd Composition Records

Mono Lake herd composition counts have been conducted since 1977 when the Nevada Department of Wildlife began helicopter surveys of the inaccessible winter range. This data is presented in Table 1. Sample sizes have varied, but were ample in all years. Low fawn production and survival is indicated by fall

counts. This factor was cited in the 1964 U.S.F.S. Habitat Management Plan for the herd's summer range. (Schneegas, 1964.)

Winter losses have been relatively light. Buck ratios have been severely depressed by the high 1981 harvest and continued high level of hunting pressure.

Mortality Factors

Predation. Mountain lions and coyotes are the common predators inhabiting the deer range. Lions are "deer specialists" and no doubt take deer from this herd. In addition, it seems likely that lion numbers have increased under recent no-take regulations. No reliable estimates of lion numbers on the range are available. The overall effect on total deer numbers in the herd is unknown.

Coyotes are numerous on much of the range, and are probably the major source of predation mortality on Mono Lake deer simply because of the far greater number of coyotes compared to other predators. However, the overall effect on total deer numbers is unknown.

Uncontrolled dogs accompanying backpackers can harrass deer on the summer range, stressing pregnant or nursing does. Dogs associated with livestock operations probably disturb deer also, but to a lesser extent.

Although bears, eagles, and bobcats also occupy the herd's range, their effect on the population is believed to be minor since they aren't abundant and do not prey specifically on deer.

Winter Kill. As mentioned previously, available data indicate that winter kill during recent years has been relatively light.

Summer fawn loss. This factor appears to exert a major influence on the herd. An average of 45 fawns per 100 does has reached the winter range in each of the last five years. Potential mule deer productivity is usually estimated at 150 fawns per 100 does. If this estimate is applicable to the Mono Lake herd, over 100 fawns per 100 does is being lost before the herd reaches the winter range. Reasons for the losses are unknown, but it is obvious that a high percentage of fawns are being lost either prenatally, at birth, or during the first months of life.

Nutrition. No specific information is available relating to forage production or quality on the herd's range. Deer observed appear to be generally in good condition and bucks harvested are usually in excellent condition. However, nutritional factors may be involved in early fawn losses.

Road Kill. A large percentage of the herd crosses Highway 395 twice annually during migration. Thus, many are killed by vehicles. The extent of this loss and its effect on the herd is not known.

Illegal Kill. The relatively sparse human population and limited road access into much of the range suggest a low level of poaching activity. Reports from the public and knowledge of various enforcement agencies tend to substantiate a relatively low illegal kill. It is generally believed that much of the illegal kill is occurring during the regular hunting season when some reports are received of spike and doe carcasses in the field.

Mono Lake Deer Herd

Table 1

	Harvest		Composition Counts/100 does		
Year	Buck	Doe	Bucks	Fawns	
				Fall	Spring
1957	349	45	-	-	-
1958	322	196	-	-	-
1959	359	-	-	-	-
1960	289	81	-	-	-
1961	328	-	-	-	-
1962	385	110	-	-	-
1963	630	134	-	-	-
1964	453	344	-	-	-
1965	308	302	-	-	-
1966	314	293	-	-	-
1967	116	165	-	-	-
1968	168	-	-	-	-
1969	61	-	-	-	-
1970	117	-	-	-	-
1971	102	-	-	-	-
1972	118	-	-	-	-
1973	157	-	-	-	-
1974	150	-	-	-	-
1975	247	-	-	-	-
1976	189	-	-	-	-
1977	205	-	25	65	58
1978	250	-	-	-	-
1979	270	-	27	33	-
1980	258	-	21	57	44
1981	374	-	13	56	54
1982	202	-	6	41	-
1983	213	-	5	39	39
1984	378	-	9	56	53
1985					

Human encroachment and disturbance. Housing and recreational encroachment are significant factors affecting the herd. Urban and suburban development continues around the June Lake Loop area, usurping good deer habitat areas. Housing subdivision is being considered near Wilson Creek north-west of Mono Lake, within a major deer migration corridor.

Most of the herd's range is public land heavily used by recreationists; disturbance of deer is most severe on summer fawning habitats. Especially in the backcountry, recreational use is high and demand is increasing. Many trails receive heavy and almost continuous traffic. Backpackers often camp in prime meadow and riparian habitats.

There has been interest in hydroelectric and geothermal developments within the herd range. Such encroachments have a high potential to degrade deer habitats through disturbance and impacts to riparian vegetation.

Herd Range Description And History

Topography,soils, climate.

The herd's range extends through elevations from about 5,000 feet on the Excelsior Range (Nevada) winter habitat to well over the 10,000 foot elevation on the Sierra crest. It is believed that some Mono Lake deer summer on the Sierra west slope. Areas and elevations used there are unknown.

The range includes gently sloping brushlands at the low and intermediate elevations, sheer granite escarpments, and moderately sloping woodlands on the west slope of the Sierras. Much of the summer range topography is very steep and rocky

making it of low value as deer habitat.

The soils of the summer range are described as being shallow to moderately deep (10-40 inches) and generally having a sandy loam texture. Rock content varies from 0-35%, with the steeper slopes being more rocky. Water retention capability tends to be low and in inverse proportion to rock content. Much of the Sierra escarpment is a massive granite barrier.

Soils on the winter range are highly erodable decomposed granites with an inter-mixing of sandy loam, generally shallow and rocky.

The climate of the unit is characterized by heavy snowfall and low temperaures during the December-April period. Average annual precipitation is approximately 60 inches at 10,000 feet and about 10 inches at 5,000 feet. Most of the precipitation is in the form of snow, but summer rains are common at higher elevations.

Range History

Early reports by explorers Walker in 1834, Fremont in 1844 and Von Schmidt in 1856 indicated sparse game populations (primarily bighorn and antelope) in the general region. The mining industry stimulated development in Mono Country and during the 1860's a grazing economy was established. Large bands of domestic sheep were grazed beginning in the 1870's and by the turn of the century, many thousands of sheep were grazing the range. At about the same time, heavy hunting pressure combined with excessive grazing of the bunch grass to virtually eliminate the antelope and bighorn. Bunch grass ranges were converted to

browse, mainly bitterbrush and sagebrush. This enhanced deer feed and prompted a gradual increase in deer numbers until the 1930's.

Grazing restrictions on National Forest lands and the passage of the Taylor Grazing Act in 1934, which regulated grazing use of public domain lands, reduced grazing pressure significantly. Browse species continued to flourish and deer numbers increased dramatically during the 1940's and 50's.

Current Grazing Use

As on most public lands grazing use here is high. Table 2 presents current BLM range allotment data.

Table 2

Allotment Name	Head	Dates	AUM'S	Deer AUM'S
Bramlette		10/1 -2/28	738	12
Adobe Lake		6/1 -10/31	77	0
Symons		6/1 -10/31	93	0
Granite Mountain		7/1 -10/15	3465	52
Adobe Valley		6/15-11/15	1636	2
Evans		Unspecified	342	0
Squaw Creek		10/15-3/31	178	0
Harfield Flat		10/15-2/15 2/16-4/15	4241	0

Table 3 presents current USFS range allotment data.

Table 3

Allotment Name	Head	Dates	AUM'S
Adobe Hills	19 (cattle)	12/1-3/31	76
Alger Lake	1000 (sheep)	7-1-8/15	1500**
Alpers Canyon	10 (cattle)	6/1-10/30	
Black Canyon	214 (Cattle)	7/15-10-10	759
Bloody Canyon	1000 (sheep)	6/16-9/15	3000**
Clark Canyon	on 42 (cattle)	7/1 -8/31	217
	*off 58 (")	" "	300
Dexter Creek	1200 (sheep)	7/1 -8/31	2400
	180 (cattle)	7/15-9/15	360**
Horse Meadow	on 525 (sheep)	9/6 -9/30	437**
	*off 975 (")	" "	812**
June Lake	1800 (sheep)	7/1 -8/30	3600**
	1800 (")	7/1 -8/26	3360**
Lee Vining	on 935 (sheep)	7/1 -9/8	2119**
	*off 565 (")	" "	1281**
Long Valley	600 (cattle)	6/16-7/15	600
	200 (")	7/16-9/15	400
Mono Mills	5750 (sheep)	7/1 -8/30	11,500**
Reversed Creek	20 (horse)	7/1 -9/30	60
Turner	325 (cattle)	6/6 -8/5	650
Deadman	1500 (sheep)	7/1 -9/20	3990**
	1500 (sheep)	7/1 -9/1	3000**

* "off" denotes adjacent private land lease administered by USFS
** Sheep Months

As evidenced by the dates and AUM figures in tables 2 and 3, situations exist for potential competition between livestock and

deer, especially on summer ranges during fawning and on key winter ranges.

Land Ownership

Approximately 90-95% of the herd's range is public land administered by the U.S. Forest Service, The Bureau of Land Management, and the City of Los Angeles. (Figure 2) The small privately owned fraction of the herd range is not primary deer habitat, except near the June Lake Loop.

Recent fire history

Locations and approximate sizes of fires recorded in USFS records are shown on Figure 3. Little is known of the effects of these fires on deer or other wildlife.

Seasonal Ranges and Vegetation

Winter Range

The herd uses about 100 square miles in various areas of the Wassuk and Excelsior ranges (Mineral County, Nevada) and the Montgomery Pass area in California at various times during the winter, depending on weather severity. Major use areas are shown in Figure 4. It is believed that much of this winter range is shared with deer of the adjoining East Walker herd (Ganz, K.R. 1968). Some intermixing with the Casa Diablo herd to the south probably occurs on the Truman Meadow winter range.

The animals concentrate on the lower slopes where the plant community is composed of Pinyon (Pinus monophylla), Juniper (Juniperus occidentalis), Bitterbrush (Purshia sp.), sagebrush (Artemesia sp.), and rabbitbrush (Chrysothamnus sp.). Various grasses and forbs, including filaree,(Stipa sp.) and (Poa sp.)

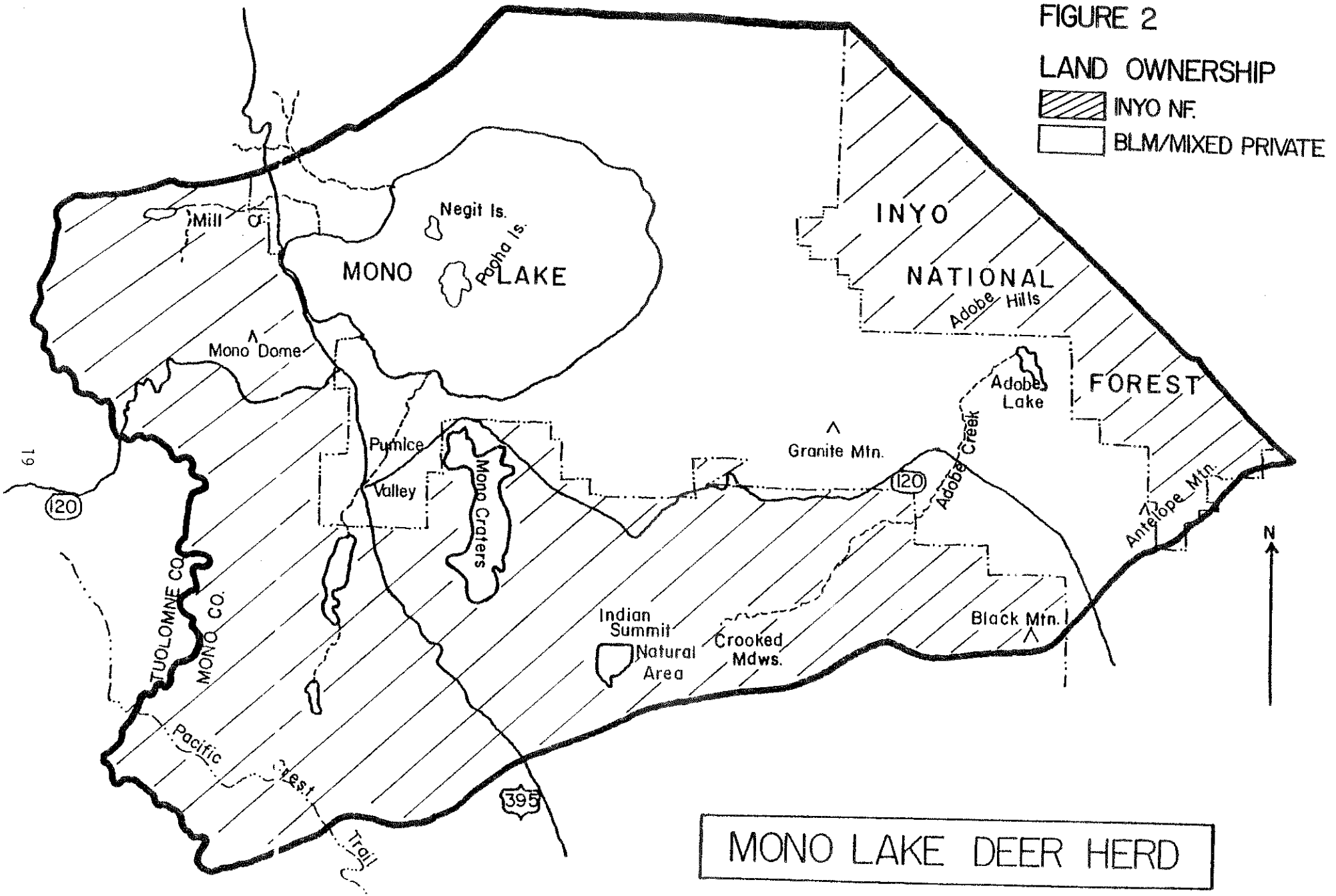
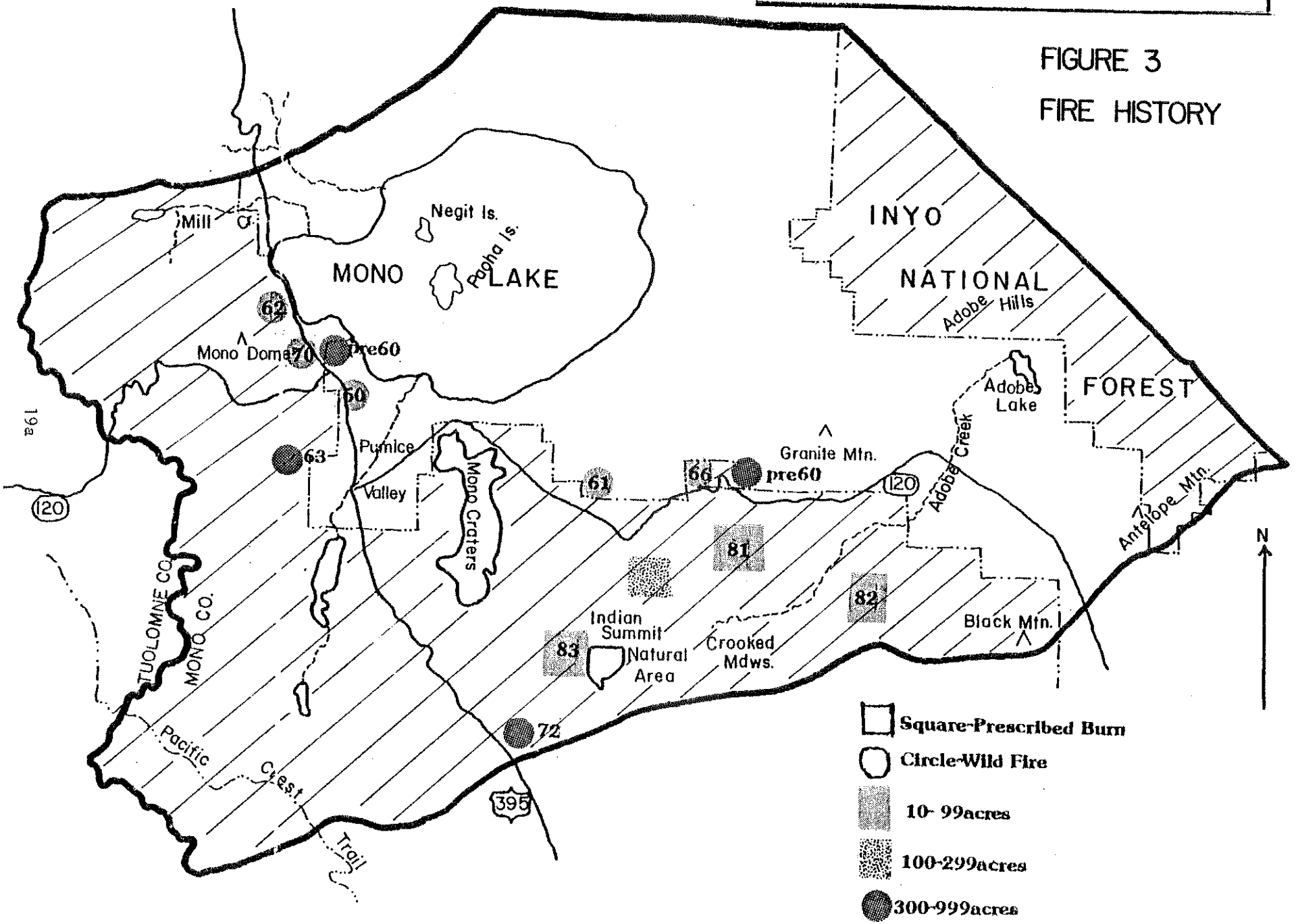


FIGURE 2
LAND OWNERSHIP
INYO NF.
BLM/MIXED PRIVATE
INYO
NATIONAL
FOREST
Adobe Hills
Negit Is.
Paoha Is.
MONO
LAKE
Mill Cr.
Mono Dome
Pumice
Valley
Mono Craters
Granite Mtn.
Adobe Lake
Adobe Creek
Antelope Mtn.
Indian Summit
Natural Area
Crooked Mdws.
Black Mtn.
TUOLOMNE CO.
MONO CO.
Pacific Crest Trail
120
395
N
MONO LAKE DEER HERD

MONO LAKE DEER HERD

FIGURE 3

FIRE HISTORY



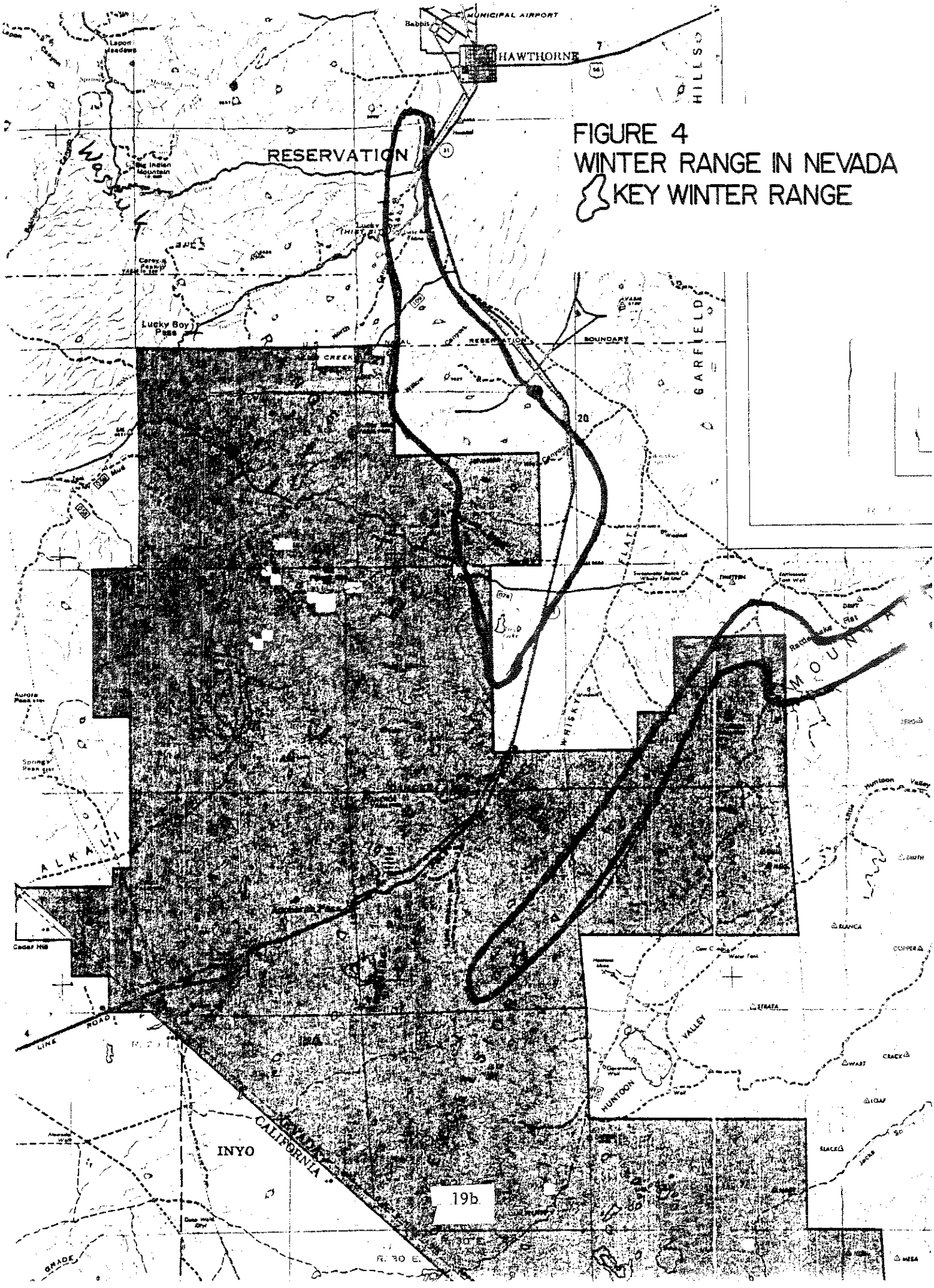


FIGURE 4
WINTER RANGE IN NEVADA
KEY WINTER RANGE

provide deer feed when suitable weather conditions occur.

The majority of the winter range is public land administered by the USFS and BLM.

Summer and Intermediate Range

According to the "Habitat Management Plan for the Mono Lake Deer Herd Summer Range" (Schneegas, 1964) the herd summers on about 350 square miles in the upper elevations of Yosemite National Park, on the Mono Lake District of the Inyo National Forest, and to a lesser extent, on the Bridgeport District of the Toiyabe National Forest. (for discussion of deer summer range on the Toiyabe N.F. see the East Walker Herd Plan) The herd summers on both sides of the Sierra Nevada crest in Mono and Tuolumne Counties according to the 1964 Plan. The eastside summer range includes the following major drainages: Virginia Creek (the north boundary of the herd's range), Mill Creek (Lundy Canyon), Lee Vining Creek, Bohler Canyon, Bloody Canyon, Parker Creek, Rush Creek, Glass Creek, and Deadman Creek (the south boundary of the herd's summer range).

Plant communities (Munz and Keck, 1965) on the summer ranges include the following:

1. Alpine Fell-fields: Mostly above 10,500 feet, little deer use.

   Hulsea algida, Ivesia shocklevi, Carex spp (sedges), Eriogonum ovalifolium

2. Subalpine Forest: 9,500-10,000 feet, upper deer range

   Pinus murrayana, Salix petrophilia, Ribes cereum

3. Lodgepole Forest: 8,300-9,500 feet; light deer use in pure stands; little plant diversity there.

   Pinus murrayana, Artemisia rothrockii in openings

4. Red Fir Forests: 7,000-9,000 feet; heavily used deer habitat

Abies magnifica, Populus tremuloides
Castanopsis sempervirens, Ceanothus cordulatus
Purshia tridentata

5. Yellow Pine Forests: 6,500-7,000 feet; heavy use by deer

Pinus jeffreyi, Cercocarpus ledifolius, Purshia tridentata, Arctostaphylos patula, Artemesia tridentata

6. Sagebrush scrub 5,000-7,500 feet; (Mono Herd intermediate ranges); Heavily used deer habitat

Artemesia tridentata, Purshia tridentata, Chrysothamnos spp

In addition to those major communities recognized in the literature, the following vegetation types are important to this herd on its summer range:

Mountain chaparral, indicated by:

Greenleaf manzanita (Arctostaphylos patula)
Bitter cherry (Prunus emarginata)
Buckbrush (Ceanothus cordulatus)
Deerbrush (Ceanothus velutinus)
Current (Ribes cereum)

Meadows, indicated by:

Various grasses and forbs; clovers (Trifolium spp), (Poa spp), lupines (Lupinus spp), and sedges (Carex spp), Rushes (Juncus spp), Cinquefoil (Potentialla spp).

Basins with a mixture of forest, browse, and riparian habitats provide favored deer use areas and are also heavily used by recreationists.

Data compiled from the Inyo National Forest vegetation data base follows, showing habitat composition by acres and percent on the Inyo National Forest. (Table 4)

Table 4

Vegetation type	Acres	Percent of herd range
Jeffrey pine	57,821	21
Pinyon-juniper	38,826	14
Lodgepole pine	37,540	14
Barren	36,209	13
Big sagebrush	30,331	11
Bitterbrush	26,662	10
Alpine vegetation	7,430	3
Mountain mahogany	6,866	3
Montane shrub	4,984	2
Subalpine forest	6,698	2
Mixed conifer	4,420	2
Quaking aspen	4,500	2
Red fir	4,973	2
Perennial grass	3,063	1
Wet meadow and riparian	690	0.2
Low sagebrush	2,088	0.8
Water	3,197	1
	275,638	102.0

Major Factors Regulating The Population

Factors which regulate a deer population are complex and interrelated, and the additive effects of several can combine to produce a markedly favorable or unfavorable set of circumstances for deer survival and production. However, these complex factors can be classified into two general categories, human influences and environmental influences. Undoubtedly, the most profound influences fall into the first category.

Human influences

This section will discuss separately the various human influences affecting the herd. However, it must be emphasized that the cumulative impacts of several human activities can create very harmful additive effects. Each individual project may have only limited impact, but the combined effects of several projects may be highly detrimental. For example, a ski area alone will create a certain level of impact to deer habitat, a level which may be possible to mitigate. In the same area, the accompanying residential development, roads, warming huts, lodges, parking areas, coffee shops, etc. will severely impact the habitat and the herd, resulting in severe reducton or elimination of deer (and other wildlife) there. When dog harrassment, grazing disturbance, geothermal plants and pipelines, hydropower developments, campgrounds and trailer parks, and other factors are added the prospects for the future of wildlife becomes bleak.

Livestock. As previously discussed, with the exception of National Park lands virtually all suitable ranges used by the herd are grazed by domestic livestock. According to recent

research on the North Kings deer herd in Fresno County, deer show little tolerance of livestock and are forced out of favorable habitats by the more aggressive domestic animals (Ashcraft, 1978). This research found deer use to be inversely proportional to cattle use, and that pregnant and lactating does are particularly affected. When forced to use more marginal habitats, does and fawns are subjected to nutritional stress and presumably to increased predation. Fawning success is reduced accordingly.

Distribution patterns and timing of arrival of livestock are of primary concern in maintaining deer populations and perpetuating the long-term health of the ecosystem. Even when total livestock quotas are within the carrying capacity of an allotment, cattle concentrate on favored areas including meadows, stream banks, and aspen groves while adjacent areas are only lightly used. Similarly, sheep are herded to the same best forage types and sometimes remain until forage and cover is seriously depleted. Soil damage and erosion can follow. When livestock arrive on fawning grounds before July 30, disturbance associated with livestock, men, and dogs can impact fawn production.

The literature provides many examples of the negative effects on deer due to improper grazing programs. McKean and Bartman (1971) found mule deer mortality to be two to three times greater in controlled study pastures heavily stocked with livestock than in pastures grazed at light or moderate rates. Knowles (1976) suggested depressed fawn production and survival in heavily grazed pastures. On the ungrazed Three Bar Wildlife Area in Arizona, mule deer density was much higher than on all

adjacent grazed areas Galliziolli (1977). McMahan (1964) and McMahan and Ramsey (1965) reported satisfactory deer reproduction and survival only in areas with little or no livestock competition. In their study area, no fawns ever survived in pastures heavily grazed by livestock.

Elimination of livestock grazing from public lands is not feasible, nor is it the aim of this discussion. Evaluation of grazing practices can and should be undertaken, however, with the welfare of other resources such as deer in mind. Generally speaking if range managers and users place emphasis on maintaining the long-term productivity and health of the ecosystems, sustained yield of all resources can be realized. Certain key deer habitats, when identified, could and should be managed, with or without grazing, to maximize values for deer and other wildlife. The Parker Bench area as an example, is potentially excellent fawning habitat, heavy sheep impact at the upper elevations is seriously reducing the production of fawns, however.

Hunting. Hunting of bucks is presently the major consumptive utilization of Mono Lake deer and is a major factor influencing buck numbers, ratio, and age structure in the population. Annual buck seasons have varied in the past from three to six weeks. Three-week seasons ending before any stormy weather have tended to reduce harvest somewhat. The 1981 season of four weeks had an early storm, causing an early migration and a dramatic increase in hunter take.

Buck ratios were severely reduced and have remained very low since due to continued heavy hunting pressure and low

recruitment. This trend has continued throughout 1982, 1983 and 1984. Favorable climatic and feed conditions have contributed to high harvest in spite of low buck ratios. During those years, late spring storms delayed migration, yet provided excellent feed at lower elevations. Many bucks remained on these accessible ranges and were readily available to hunters. Many yearling bucks grew forked antlers due to good feed conditions. These inexperienced bucks were easily taken and made up the majority of the bag in some areas.

Antlerless hunts were conducted during the years 1955 through 1967. Antlerless seasons varied from three days to six weeks. The harvest of does was concentrated in the area east of Highway 395 and south of Highway 120. Deer numbers are low in that area at present. Removal of a high number of does from traditional fawning habitat, and subsequent failure of does to recolonize those fawning habitats may depress future populations in those areas.

Crippling loss of legal bucks must be considered, since various researchers estimate this loss at between 26% and 72% of the recorded legal take, representing another factor influencing the sex ratio of the herd.

Encroachment on Habitat

Residential Developement. Unfortunately, the Mono County planning process does not give adequate recognition to the values of key deer habitats when project proposals are reviewed. In some cases findings of no significant impacts have been reached without prior consultation with resource managers regarding wildlife

values. Projects have been approved in this manner and irreversible inroads into key deer habitats are the result. Residential development of such habitats is especially inappropriate in an area such as Mono County where recreation is of major economic value. Recent analysis has shown that developed residential property can produce more costs than revenue and that undeveloped land pays more in revenues than the corresponding costs to service that land (Goldman et al, 1979)

Continuing expansion of housing and other urban development is affecting historic deer habitat, especially around June Lake. Future incorporation of the June Lake community could stimulate growth through broader services. Increasing impacts to deer could result. Free-roaming dogs associated with housing harass deer, severely stressing and killing animals outright in some instances. Fortunately, there is little actual or threatened impact from residential development on most of this herd's range.

Recreational Development. The existing ski development on June Mountain is within the summer range of the herd. However, little is known of the impacts on the deer resource there. There is a potential site for ski development on San Joaquin Ridge. This area is believed to be an important summering area, with major migration routes. The fate of a significant portion of the herd may depend upon whether this area is developed. If developed, methods of construction and operation will be aspects vital to the herd's welfare.

Some of the existing campgrounds withing the herd's range have encroached on important deer habitats. Campgrounds in meadows and along stream courses are favored sites.

Hydroelectric and Geothermal Projects There are currently several applications on file for construction of small hydroelectric projects within the range of the Mono Lake herd. Geothermal energy development is also possible. Potential impacts to the herd vary from nearly negligible to very severe depending on type, size, and location of the project. Coordination with land managing agencies and local governments is ongoing in an attempt to minimize adverse effects. Careful evaluation of each site will be necessary to protect wildlife resources.

Human Disturbance Dispersed recreational use of the intermediate and summer range is high throughout the season. People, dogs, and packstock all contribute to disturbance of deer, often in key fawning habitats where reproduction and survival of fawns may be affected.

Timber Production Some areas of the herd's range have commercial timber. Harvest and silvaculture methods can significantly influence deer habitat quality. Creation and retention of new roads in harvest areas can be especially detrimental. Past and current influences of timber production on the herd are little known at this time.

Environmental Influences

Weather It is known that prolonged deep snow cover on the winter range creates a stressful situation and many deer are lost in such conditions. In Wyoming, crusted snow .3 meter (1.0 feet) deep caused deer to move to other areas with less snow (Strickland 1975). Late persisting snow on intermediate and

summer ranges can delay spring migrations. Such a delay also creates stress and can reduce fawning or recruitment that year.

Other effects of weather are less dramatic and not well understood. For example, early precipitation during the 1981 fall prompted the growth of grasses and forbs during October and November. Deer arrived early on the winter range because of the early storm system, and found good herbaceous feed. This weather pattern appears to have created a (short-term) favorable feed situation which sent the deer into winter in good condition.

The influence of weather can affect timing of migration and rutting. While migrations are generally held to be habitual, they may be accelerated or delayed by unseasonable snowfall or cold (Geist, 1981). The effects of such a weather pattern were graphically illustrated during the 1981 deer hunting season. An early storm, coupled with a lack of feed at higher elevations (which was due to low precipitation the previous year) prompted deer to migrate, and essentially the entire herd became accessible to hunters. An exceptional hunter take of mature bucks resulted.

Inclement weather prolonged into late spring can delay migration to summer ranges, preventing pregnant does from reaching traditional fawning grounds. It is believed that reduced fawn production can result, especially where quality fawning habitat is lacking on transition ranges. Late spring storms delayed migration and stimulated feed, buck antler growth and harvest during 1982, 1983, and 1984.

Free water is available throughout most of the range of the Mono Lake herd but water availability is limiting deer use on some areas of otherwise good range. Prolonged drought can reduce availability of water. Another pronounced effect of drought conditions is reduction of annual browse and forb production.

Summer thunderstorms can be locally important to Mono Lake deer by providing for young herbaceous forage through the summer months and even into fall. Weather can affect predation. Cover for fawns is reduced by dry years. This would increase their vulnerability.

Predation The precise influence of predation on the Mono Lake herd is not known. It is known that predators kill substantial numbers of deer on many ranges (Connolly, 1981). Only careful study would define the true effect on this population. Conversely, predation by coyotes or mountain lions has never been documented as the principal cause of a mule deer decline (ibid).

Since fall fawn ratios are low, it is assumed that predation has some effect on fawn recruitment. However, predation losses can be caused or accentuated by poor fawning habitat, grazing practices, weather, poor nutrition, etc. Only through complete analysis of these factors can it be determined if predation causes deer to be less numerous than they would be in the absence of predation. (Connolly 1981).

It seems likely, however, that current protection of mountain lions from sport harvest is resulting in increased lion populations and increased take of deer by lions.

POTENTIALS FOR RESTORATION AND MANAGEMENT UNIT GOALS

Potentials for Restoration

The statewide goal for California deer herds is to restore and maintain healthy deer populations and to provide for high quality, diversified use of the deer resource. However, before one can begin to state specific objectives and programs to implement those objectives, several fundamental determinations must be made, including: (1) possible mechanisms for restoration; (2) the factors which inhibit or conflict with restorations (3) the overall potential levels for restoration (4) potential harvest strategies and intensities of utilization and (5) considering the mix of all major issues and concerns, the preferred level of restoration and utilization.

The Nevada Department of Wildlife, with California DFG input, arrived at a goal of reasonable deer numbers for the herd in their 1978 report "Wildlife Habitat Plans For the Future; Walker-Mina Planning Units". These units encompass the Mono Lake herd winter range which is in Nevada. This goal was developed using average and extreme population estimates.

The 1962-76 average pre-season population calculated by the Nevada Department of Wildlife was 2347. The high population level was estimated at 5964 in 1964. A low, reached in 1970, was estimated at 578. The goal of future management was to achieve a population of 3930 animals which represents a 67% increase over the past average, and about a 35% increase over the current 1985 estimated population of 2907.

This goal is still reasonable today. Since most of the

herd's range is publicly owned, the threat of extensive urbanization is minimal. Further, the winter ranges are large areas with substantial management opportunity. Some historically-used summer ranges are currently receiving little or no deer use. Evaluation and management of such habitat is needed.

Deer numbers have apparently increased somewhat since Nevada's 1978 report was issued. Further increases will require diligent habitat and harvest management however, since it is believed that the herd is near the carrying capacity of some seasonal ranges, especially winter ranges. Increases in deer numbers can only be achieved with improved habitat conditions, reduced competition for forage, and improvements in sex and age ratios in the herd.

Public sentiment supports habitat improvement for wildlife on public lands. Economic stability in Mono County depends to a large extent on viable fish and wildlife resources. Improving habitats is in the best interest of that economic stability. We cannot realistically hope for improvement of habitats throughout Mono County. Priorities must be placed on maintenance and improvement of key habitats vital to the deer resource. As such areas are identified, information on their values, deficiencies, and needs are provided to the land managers on an on-going basis.

Attainable Levels of Restoration

The current population, calculated using Selleck-Hart methodology, is estimated at 2907 animals. Encroachments on habitat are occurring on small portions of the summer range (especially at June Lake), and recreation impacts have somewhat reduced deer habitat quality. However, the key ranges are intact

and winter range quality is believed to be stable, but less than optimum as reflected by heavy use by livetock and increasing use by wild horses.

For these reasons, and because of the high public demand for use of California deer herds, it is felt that efforts to increase the herd are justified and reasonable. Therefore, the stated 1994 target level of herd restoration through this planning effort is 4,000 deer and agrees with Nevada's goal stated in 1978.

Utilization Levels and Alternative Strategies

At present only forked horn or better bucks are harvested with negligable restrictions of hunting pressure. Low post season buck ratios during the past 2 years (about 6 per 100 does) reveal that a maximum buck kill is occurring. Such intensive harvest of bucks has certain drawbacks. The average age of animals killed is inversely related to the size of the harvest (Connolly 1981). Large, older animals are almost absent in the harvest, since nearly all bucks killed are less that 4 years of age. In fact, 65% of bucks aged in Mono County throughout the 1983 and 1984 hunting seasons were yearling animals. Other field studies (Brownlee 1975) and computer modeling (Gross 1973; Anderson et al. 1974) have demonstrated this decline in older animals with increasing harvest. Such an intensive rate of buck harvest also tends to depress the buck-doe ratio in the herd. Again, field studies (Robinette 1956) and computer modeling (Anderson et al. 1974) attest to this fact. The low buck/doe ratio and resultant low percentage of older bucks in the herd is cause for concern to some professionals and the public. Nevada Department of Wildlife biologists share the concern about this preponderance of

Key deer use areas in Nevada are well known. It is uncertain, however, which herds use which winter ranges. Mixing of herds is believed to occur. Other seasonal habitats such as migration routes, holding areas, and fawning sites are not well defined. Effective herd and habitat management will require more specific information on these habitats.

Radio telemetry offers the latest technology available to follow animal movements and to define key habitats. Deer are readily captured on winter ranges where terrain and cover are favorable and animals are concentrated.

With the use of traps, tranquilizing equipment, or set nets and helicopters, animals from different areas of a winter range are captured, examined, and fitted with telemetry collars. By marking animals at various locations, researchers obtain a broad range of data on the herd and habitats. Habitat quality is then determined by on-the-ground surveys.

Summer Fawn Losses Over the years, data has indicated a significant loss of fawns before fall composition counts (10 year average fall fawn ratio: 53 fawns per 100 does). Intensive research is needed to identify specific causes of this early fawn mortality.

Nutrition There are indications (sightings, carcasses) of nutritionally stressed deer on Mono Lake winter ranges. Collection and necropsy of debilitated animals is needed. Food habits (stomach analysis) work and range quality assessments in problem areas are needed. Identifying deficiencies and causes of the problems would lead to measures to relieve stresses and

benefit herd vigor and recruitment. Diaminophosphoric Acid (DPA) analysis of fecal pellets offers an experimental method of assessing digestible protein in the diet. Determination of levels of selenium and other trace elements through blood analyses is recommended whenever blood samples can be obtained.

Public Attitudes It should be noted that concern by the hunting and local publics for the welfare of deer reinforces the need for research on this valued resource.

Inventory and Investigative Programs

Objective: Gather and evaluate herd life history and trend data, and assess key habitat locations and vegetative trend information. This will allow the making of ecologically sound, socially acceptable management recommendations and decisions.

Inventories recommended

Continued monitoring of basic herd and habitat performance indicators is required.

Herd composition: Fall and spring using ground and aerial counts.

Size of hunting harvest: Check stations (opening and closing weekends), tag tally.

Age class structure of buck kill: To be obtained at opening and closing weekends check stations and throughout the season at locker plants.

Spot kill mapping will continue.

Additional Monitoring recommended:

Aerial and/or ground summer composition counts and habitat surveys (helicopter recommended).

Hunting pressure evaluation: Aerial survey, and car counts, opening weekend.

Routine collection and necropsy of road killed or debilitated animals as opportunity permits. Monitor parasite, disease, and nutrition factors.

Research Investigations Needed:

Telemetry study to define key areas, migration routes, herd boundaries, and deer use of proposed ski development area(s) is needed.

Fawn survival and mortality study needed. Evaluate fawn losses in conjunction with above telemetry work.

Blood seriology and nutrition research, designed to define levels of selenium and other trace minerals. This should include disease and parasite study.

Evaluate livestock impacts to deer habitat.

Investigate means of winter forage rejuvenation by planting of forage, fertilizing, etc.

Evaluate public attitudes and concerns; to be accomplished through public tours and seminars, Board of Supervisors meetings, W/L Advisory Commission meetings, etc. These steps would explore the social acceptability of investigative and management direction.

Herd Management and Mortality Element

Herd management will aim for a stabilized population of about 4000 animals (35% increase). Problems of sex ratio and buck age class structure exist in the herd. Low buck ratios reduce hunting success and may affect reproductive vitality of the herd. The low percentage of older bucks in the population severely limits the hunters chance for a larger trophy animal, and also may affect the reproductive vitality of the herd. Reduction of hunting pressure by hunter quotas, and/or adjusting the timing and length of the season may improve buck ratio and buck age distribution.

Herd composition data show recruitment problems exist in the herd. At this time little is known about the underlying causes of the low recruitment rates. Addressing the recruitment problem

must begin with investigative steps to examine nutrition, fawning habitats, predation and other aspects. Highway mortality takes an undetermined number of Mono Lake deer each year. Some data is available regarding key deer highway crossings. More information on major crossings is needed.

Herd Management and Mortality Control Program

Herd Size

Objective: Maintain an average population of 4,000 healthy animals. This represents about 35% increase and is considered an attainable goal in view of the quantity of available habitat and the fact of public ownership of the majority of the range.

Methods

Identify and enhance key fawning habitats to improve fawn survival and recruitment.

Maintain and improve winter range size and browse production by:

Experimental fertilization and burning.

Encourage land exchanges and acquisition to reduce encroachment on winter ranges.

Fawn Recruitment Rate

Objective: Attain an average spring fawn:doe ratio of 50 fawns per 100 does.

Recommendations:

Identification and enhancement of key habitats.

Identification of disturbance or other factors reducing fawning success.

Evaluation of early fawn mortality through telemetry study, apply new information.

Improvement of winter range habitat.

Sex ratio of the breeding population

Objective: attain and maintain a post season buck:doe ratio of 20:100 over the long term.

Recommendations: Vary season length and timing or hunter quota levels to reduce buck harvest. Division of Zone X-9 will be required to achieve herd-by-herd hunting pressure control.

Age Class Structure of the Population

Objective: To attain a pre-hunt buck population containing 40% 3 year and older animals; to provide a reasonable opportunity for harvest of trophy class (4 point) animals

Recommendations:

Initial reduction of buck harvest to attain goals.

Subsequent annual adjustments in harvest to maintain goal level.

Fawn Recruitment Rate

Objective: To attain an average spring fawn:doe ratio of 50 fawns per 100 does.

Recommendations:

Identification and enhancement of key habitats,

Identification of disturbance or other factors reducing fawning success.

Evaluation of early fawn mortality through telemetry study, apply new information.

Improvement of winter range habitat.

Mortality Control

Objective: To reduce highway mortality of deer.

Recommendations:

Delineate major deer crossings.

Improve warning measures.

Remove roadside vegetation at major crossings.

Experiment with reflector-scare devices or other safety measures.

Vegetative Succession

The pinyon-juniper woodland plant community has spread extensively into other habitat types during the last century. This expansion has been attributed to grazing, protection from fire, and climatic shifts (Burkhart and Tisdale, 1976). It generally occurs at the expense of understory vegetation of higher value to deer (Folliott and Clary, 1972).

The extent and effects of pinyon encroachment on the ranges of this herd, while believed to be detrimental, are not documented. Specific surveys are needed.

Advancing age of Antelope bitterbrush on the east slope is recognized as a factor reducing carrying capacities for deer. Again, specific data relating to this phenomenon is lacking. For more detailed discussion and references on pinyon-juniper and bitterbrush, see the DFG West Walker Herd Plan (Thomas, 1984).

Conflicts With Other Resource Management Programs

Grazing. Livestock grazing is the most significant and extensive land use influencing Mono Lake deer habitat at present. Livestock are grazed on all seasonal ranges of the herd except National Park lands. Timing of grazing and concentrations of large numbers of domestic animals can lower forage carrying capacity for deer and other wildlife. Disturbance by domestic animals has been observed to displace deer from key habitats.

Winter, intermediate, and summer range conflicts between deer and livestock may exist. Thorough data is needed. Specific identification of key habitats is the first step (see Research).

When key habitats and their condition are known, specific recommendations on livestock management can be developed. Possible modifications in grazing programs to benefit habitat for deer and other wildlife include: (a) delaying arrival of livestock on key habitats to provide for summer forage and cover needs of fawning, (July 20 recommended), (b) discouraging or preventing livestock concentrations in key habitats, (c) reducing allotment quotas. (d) improving range condition through vegetation management.

Timber Production Since significant acreages of the summer range are utilized for commercial logging, specific field data is needed to define the effects of logging on the herd and habitat. However, the report "Mule Deer Survey in the Deadman Recreation Area, Inyo National Forest" (Schneider, 1980) lists some means of generally reducing disturbance to deer by harvesting operations.

1. Concentrate timber operations within the smallest possible area and the shortest possible period of time. The larger the operation, the more care is required to minimize disturbance.

2. Maintain non-activity zones adjacent to zones of concentrated activity.

3. Confine timber operations to a single drainage at a time. Do not log adjacent drainages simultaneously; disturbance seems to be reduced by ridgelines. Much timber harvest here is conducted during winter months; disturbance to deer is minimized accordingly.

Roads are abundant in timber harvest areas on this range and certainly degrade deer habitat. Minimizing roads through prohibition, closure, or removal is needed.

Silviculture methods that enhance wildlife habitat are available in USFS manuals and other sources. Tree plantations now exist and others will be planned in the future. Allowances for

deer and other wildlife should be integral in such planning.

Certain measures to enhance mule deer habitat have been initiated in coordination with timber harvest and production on the Mammoth and Mono Lake Districts of the Inyo National Forest. Forest Service wildlife personnel deserve much credit for these valuable efforts.

Land Use Conversions Since the majority of the herd's range is publicly owned, the greatest threat of extensive land use conversion is somewhat less here that on other herd ranges. However, some important areas may be subject to conversion. Two such areas are now known.

San Joaquin Ridge is recognized as a prime site for ski development. It is also known to be a key deer summer habitat (Schneider, 1980). Ski development has the potential to degrade deer habitat there.

Conway Ranch is proposed for housing subdivision. Deer migrate there and through the nearby canyons. Domestic water supplies and stream hydro-power possibilities are attractive to developers. Degradation of a key deer migration corridor could result.

Expanding urbanization near the June Lakes has been discussed. Other unforeseen developments are likely due to expanding human uses throughout Mono County.

Habitat Quality Recreational use of the herd range, especially the intermediate and summer ranges, is high and demand is increasing. Fishermen, backpackers, and campers use much of the available range throughout spring, summer, and fall. Disturbance results and habitat quality declines.

Facilities for these users are often situated in good or key habitats. Campgrounds in meadows and along streams are preferred by people. Unfortunately deer need these areas for reproduction and other life functions. Research has shown campgrounds have negative impacts on deer (Ashcraft, 1977), including direct activity disturbance (humans, dogs, vehicles), forage and cover degredation, and roads creating improved access.

As previously mentioned, free-roaming dogs are particularly harmful by creating severe stress on deer, particularly does and young fawns.

Small hydro-power projects have been proposed and planned on the herd's summer range (e.g. Lee Vining Creek, Conway Ranch). These projects have potential for severe impacts to fisheries, wildlife, and their habitats. Geothermal projects are proposed within the herd's range, as well.

Habitat Management Programs

Objective: Attain and maintain habitat quality sufficient to achieve the stated herd management objectives.

Recommendations:

Identify key seasonal habitats and any deficiencies therein.

Evaluate winter range quality regarding pinyon-juniper encroachment and make recommendations for improvement.

Investigate bitterbrush quality and means of rejuvenation.

Influence planning to minimize impacts by developments, especially at June Lake, San Joaquin Ridge, Conway Ranch.

Where habitat is found to be degraded by livestock, rehabilitate key areas (aspen groves, meadows, riparian zones, migration corridors) by reducing any such impacts through changes in season of use, exclosures, herding improvements, reduction of grazing quotas, etc.

Formulate other habitat improvement techniques, with input from USFS, such as pinyon thinning, browse planting, grazing manipulation, tree falling, fencing, as needed on a site-by-site basis.

Review all hydro-power and geothermal proposals, conduct surveys, and provide recommendations to safeguard wildlife resources.

Evaluate logging and silvicultural procedures and proposals. Make recommendations to benefit wildlife habitat.

Reduce disturbances to deer on the summer range through public education and/or regulations.

Influence campground planning to minimize impacts to wildlife habitat.

Utilization Element

Harvest Strategies and Public Attitudes

Currently forked horned or better bucks are harvested with a zone-wide tag quota of 9,000. Since the record harvest in 1981, composition counts have indicated that a maximum buck take is being achieved in this herd (Table 1). Harvest strategies to increase the buck ratio and to maintain a balance in buck age class distribution are a major aim of this management plan. Reduction of buck harvest is needed at present. Subsequent to attainment of herd goals, buck harvest can be adjusted annually to maintain stated goal levels.

It is hoped that the current three-week buck season will stimulate increases in the buck ratio by reducing take. This has

not occurred in 1982, 1983, or 1984.

Active means of reducing the Mono Lake buck harvest should be intitiated in 1986 if no significant increases result from the current three-week season in 1985. The herd tag quota system provides the most positive means of reducing buck take and rapidly increasing and maintaining the buck ratio by annually adjusting the hunting pressure in response to observed herd and habitat conditions. Control of hunting pressure within Zone X-9, by herd, is not possible without dividing the zone into smaller segments, however.

When management programs succeed in increasing Mono Lake buck ratios, future tag sales can allow increasing buck take while maintaining healthy buck ratios.

The public expresses a variety of attitudes relative to harvest. Opinions range from a lack of concern to approval of, or opposition to changes in stategies. However, it is obvious that many people living in the county and many people who hunt here but live elsewhere are ready for a change in deer management. Numbers of hunters in the field have requested buck tag quotas and antlerless hunting, lamenting low buck ratios and the harvest of mostly young bucks. On the other hand some hunters, especially local residents, oppose any change, supporting the status quo.

Nonconsumptive Utilization

Casual viewing and photography of deer at all seasons on all ranges constitutes the major nonconsumptive use of the herd. The outdoor experience of thousands of summer visitors to Mono County is enhanced by the opportunity to see deer and other wildlife in natural habitat. Total day-use figures or economic value of these

uses are not known, but appear to be substantial and increasing.

At present, no problems relating to such nonconsumptive use are known to exist. The relatively open terrain and highly scenic qualities of the Mono Lake herd range provide accessible, natural benefits for causal users of the resource.

Utilization Program

Objectives:

Provide for maximum harvest of Mono Lake deer consistent with sustained yield and with achievement of stated herd goals. Maintain herd size in balance with existing habitat conditions and to achieve improved sex and age ratios. Also increase and maintain larger bucks in the bag.

Continue to provide for a level of non-consumptive use which satisfies demand and to increase information to the public.

Recommendations

Recommend annual variations in buck hunting season to respond to annual variations in herd performance. Use variations in season length, timing, and/or tag quotas as deemed necessary.

Increase deer available for harvest by increasing fawn survival through habitat improvement.

Communication Of Information Element

Discussion

Communication of information regarding the herd has been conducted through regional and statewide press releases describing general hunting conditions and herd trends. In addition, articles in outdoor publications prompted public response on herd management during 1977.

When this herd plan is finalized, copies will go to land management agencies and key factions of the public. Announcement of the plan (and it's availability) in local newspapers is recommended. Updated information (i.e.; research results) could be announced as well. Other means of communicaton and soliciting public response can be developed as needed (e.g.; leaflet form of summary of plan for wide-spread distribution).

Public information and awareness relating to the herd could be increased through a narrative display on Highway 395 showing deer photographs, browse plant identification and conditions, migration routes, and problems in management.

Communication of Information Program

Objective: Provide the public with as much information as practical regarding the Mono Lake herd.

Recommendations:

Utilize local media and/or regional outdoor publications to publicize newsworthy information.

Develop a summary of the herd plan for publication.

Attend governmental meetings and conduct public briefings to convey information on the herd and plan.

Place copies of completed plan in local libraries.

Inform public of CalTIP program.

Create a narrative display at the Mono Lake scenic overlook (or other suitable location) on Highway 395.

Review and Update

Objective: Annually review and update the herd plan to maintain a current data base, evaluate progress, and prioritize future management actions.

Recommendations:

Conduct deer management committee meetings to discuss progress, new information, direction (include USFS, BLM, LADWP, Nevada DOW, Mono County).

Incorporate annual data in plan appendices.

Use new information (research results, herd performance data, etc.). Update plan text as needed.

Law Enforcement Element

Enforcement personnel feel that illegal kill during hunting season is the major law enforcement problem in this herd. Out-of-season poaching is believed to be relatively minor at present. Increasing off-road enforcement activity in the field during the hunting season is recommended to put the warden at the scene of such illegal kills. As always, increased numbers of wardens throughout the season are desirable in such large areas of deer habitat.

Enforcement personnel enourage public education to improve hunter ethics, as in Hunter Safety Classes. Public meetings or news releases could increase public awareness of problems of illegal kill and general hunter ethics.

Law Enforcement Program

Objective: To improve the level of compliance with deer hunting laws.

Recommendations:

Continue the intensive opening weekend patrol effort using wardens from other districts.

Extend the intensive patrol effort to include other periods of peak activity like the last weekend of the season.

Educate the public concerning hunting regulations through formal presentations and informal contacts.

Maintain and increase as needed coordination with other enforcement agencies (county sherrif, USFS, etc.)

Expand patrol efforts to include back country areas.

Advertise the CalTip program.

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Mono Lake Deer Herd Plan

Annual Update - 1985

I. Standard routine data collection was performed during 1985 including post-season and spring composition counts, harvest data, and buck age compositon, gathered throughout the season.

Composition Counts

Year	Post-Season bucks:100 does	Post-Season fawns:100 does	Post-Season Sample	Spring fawns	Spring Sample
1984-85	9	56	344	53	514
1985-86	6	52	257	20	272

Harvest

Year	Buck
1985	363

Buck Age Composition

	Yearling	2 years	3 years	4+ years
1985	12 (31%)	12 (31%)	10 (26%)	5 (13%)

II. No habitat improvement projects were undertaken in 1985; to the contrary, the acquisition of June Mountain Ski area by the Mammoth Mountain Ski Area and the projected expansion of June Lakes carries threats for the future of Mono Lake deer herd using that portion of the range.

III. No major changes to the plan.

Mono Lake Deer Herd

Table 1

Year	Harvest		Composition Counts/100 does		
	Buck	Doe	Bucks	Fawns	
				Fall	Spring
1957	349	45	–	–	–
1958	322	196	–	–	–
1959	359	–	–	–	–
1960	269	81	–	–	–
1961	328	–	–	–	–
1962	385	110	–	–	–
1963	630	134	–	–	–
1964	453	344	–	–	–
1965	308	302	–	–	–
1966	314	293	–	–	–
1967	116	165	–	–	–
1968	168	–	–	–	–
1969	61	–	–	–	–
1970	117	–	–	–	–
1971	102	–	–	–	–
1972	118	–	–	–	–
1973	157	–	–	–	–
1974	150	–	–	–	–
1975	247	–	–	–	–
1976	189	–	–	–	–
1977	205	–	25	65	53
1978	250	–	–	–	–
1979	270	–	27	33	–
1980	258	–	21	57	44
1981	374	–	13	56	54
1982	202	–	6	41	–
1983	213	–	5	39	39
1984	378	–	9	56	53
1985	363	–	6	52	20

Memorandum

To : Wildlife Management, Region 5

Date : September 24, 1987

From : **Department of Fish and Game**

Ron Thomas

Subject : Mono Lake Deer Herd Plan Update - 1986

I. Due to shortage of helicopter time and inaccessibility of the ranges, no composition counts were conducted during 1986-87. Total buck harvest was determined by tag returns.

Year	Harvest Buck
1985	353
1986	300

Buck Ages

Yr	2yr	3yr	4+
4(15%)	12(46%)	10(38%)	0

II. No habitat improvement projects were undertaken. Funding was approved to begin radio-telemetry research of the herd in early 1988.

III. Major Plan Changes:

It has been recommended to create a new hunting zone (X9) encompassing the Casa Diablo and Mono Lake herd ranges to better control hunter distribution and take, and to stimulate increases in buck ratios.

Ron Thomas

Ron Thomas
Wildlife Biologist

RT:lp

cc: V. Bleich
J. Davis

State of California

The Resources Agency

Memorandum

To : Wildlife Management, Region 5

Date : October 12, 1988

From : **Department of Fish and Game** --Ron Thomas

Subject: Mono Lake Deer Herd Plan Annual Update, 1987-88

I. Composition Counts

Year	Post Season Bucks/100dd	Fall Fawns	Fall Sample	Spring Fawns	Spring Sample
1986-87		No Sample			
1987-88	17	41	317	35	285

Harvest

1986:	300	Nevada	Nevada Antlerless
1987:	129	102	41

Note: Nevada harvests are Increasing

II. No habitat improvement projects were undertaken.

III. Major Plan Changes: A new hunting zone (X9A) was created in 1987 to better control hunter distribution, pressure and take, and to stimulate increases in buck ratios. Harvest was reduced and buck ratio increased.

The telemetry study at this herd and the adjacent East Walker Herd was initiated in early 1988. Early results of this work provide new insight into herd boundaries and suggest the advisability of realignment of hunt zone boundaries.

Ron Thomas

Ron Thomas
Wildlife Biologist

RT:lp

cc: J. Davis

1989 Deer Herd Management Plan Update

County: Mono

A. Description of Deer Herd Management Unit

1. Herd Condition - Fair

a. Animal Condition - In 1987 and 1988, deer were shot and necropsied on the winter ranges and UFIs were: 1987 - .41, 1988 - .37. Body weights were: 1987 - 106 lbs, 1988 - 108 lbs. While these figures indicated good condition at that time, it is strongly suspected that current winter condition is poor-fair as a result of three consecutive drought years.

Reference: Collection data, field observations.

b. Herd health - Herd health is fair to poor as indicated by recent low fawn survival and relatively old average age of does: 1987, average age of 19 does = 3.9 yrs; 1988, average age of 20 does = 5.5 yrs.

Reference: Collection data, annual composition counts

2. Population size - No reliable estimates are available, but it is suspected that the population has declined within the past 3 years as a result of severe drought conditions, especially on the winter range.

3. Herd Statistics

	Harvest		Fall		Spring
Year	Bucks	Antlerless	Bucks	Fawns	Fawns
1985-6	141	-	15	61	21
1986-7	100		6	60	39
1987-8	140		6	36	18
1988-9	175		12	18	15

4. Deer Hunting

a. Past and current hunting strategies' effects on:

1. Deer numbers - Considering the small percentage of the population taken through bucks-only hunting which is closely regulated by quota tag sales, it is extremely unlikely that recent past and current hunting strategies have affected overall deer numbers in the herd.

2. Herd composition - Hunting strategies prior to 1986 provided little control of hunter distribution and a large tag quota; these acts probably contributed to low buck ratios. Current hunting strategy employs a flexible quota tag system based on herd performance designed to increase buck ratios by limiting harvest. Ratio increases have been impeded by drought. Newly proposed relignment of hunt zone boundaries to coincide with known herd boundaries would further improve control of hunter distribution and take.

3. Herd health - Studies and collection data suggest that buck ratios as low as 6:100 does do not have a measurable effect on breeding or overall herd health. No other posible effects of hunting on herd health are known or suspected.

b. Future and proposed hunting strategies' effects on:

1. Deer numbers - Continued bucks-only hunting cannot be expected to affect total deer numbers. If desired, future doe hunting could be used to regulate total deer numbers.

2. Herd composition - Proposed seasons and quota levels are aimed at increasing buck ratios through carefully regulated harvest. Increased precipitation yielding improved forage and increased fawn survival are essential to effect and maintain higher buck ratios, however.

3. Herd health - Continued bucks-only hunting or regulated doe hunting will not affect overall herd health. Research indicated annual precipitation to be the major factor influencing the performance of the adjacent Sherwin/Buttermilk Herd unit (Kucera, 1988)*

5. Illegal Harvest - No known changes in the level of illegal kill have occurred since the herd plan was completed.

6. Other - Road kill

An estimated 50 deer are killed each year by vehicles on Highway 395. The effect on total population is unknown. A research project and negotiations with CalTrans are ongoing in an attempt to reduce highway kill.

*Kucera, T.E., 1988, Ecology and Population Dynamics of Mule Deer in the eastern Sierra Nevada. Unpub. Ph.d. Dissertation, U. Calif. Berkeley.

B. Non-human Effects on Deer

1. Weather

a. Drought - The current drought is creating a profound impact on the herd's range and forage and is the primary factor affecting fawn survival and the suspected decline in total deer numbers. The effects of drought are seriously amplified by the additive effects of poor grazing practices in all seasonal ranges used by both livestock and deer.

b. Early storms - Early storms in September and October have improved fall forage and benefitted deer to a limited degree in 1988 and 1989.

c. Severe winters - During the 1987-88 and 1988-89 winters, temperatures as low as -30°F created severe stress conditions on winter ranges, persisting for several weeks each year. The intense cold and the poor forage conditions created by consecutive drought years combined to produce conditions very unfavorable for wintering deer. Fawn survival and the total population suffered losses as a result.

2. Predators

3. Diseases and Parasitism - Seriology testing and necropsy of collected animals has not revealed significant disease or parasite entities in the herd.

C. Effects of Current Deer Hunt and Proposed Hunting Strategies

1. Effects Upon Species of Special Concern

a. Changes in local populations - Due to the lack of intensive disturbance, lack of habitat disruption or degradation, and the short duration of the hunting season, it is not reasonable to expect any significant effects to any species of special concern.

b. Changes in regional and statewide populations - same as above.

2. Effects on Other Wildlife Species

a. Changes in local populations - Due to the lack of intensive disturbance, lack of habitat disruption or degradation and the short duration of the hunting season, it is not reasonable to expect any significant effects to other wildlife species.

b. Changes in regional and statewide populations - same as above.

c. Changes in health, condition and age class structure of populations - same as above.

d. Changes in mortality factors - same as above

3. Changes in Public Use/Recreation

a. Hunting - The current and proposed hunting strategy provides substantial public recreational opportunity to hundreds of hunters each year. Loss of this opportunity would constitute a significant negative impact to public recreation in California.

b. Nonconsumptive - Ample opportunities exist for non-consumptive use of Casa Diablo deer (i.e. viewing, photography, study). Minor and insignificant effects to this use may be caused during the hunting season, especially for those persons who are offended by hunting activity. No significant effects to nonconsumptive use are known or anticipated. Conversely, to the extent that hunting-funded deer management and habitat programs are effective, deer populations benefit for all users.

c. Nonhunting - same as above.

4. Effects Upon Human Populations

a. Housing - No effects are known or anticipated.

b. Transportation - No effects are known or anticipated.

c. Public Services - No effects are known or anticipated.

d. Energy - No effects are known or anticipated.

e. Human health - No effects are known or anticipated.

f. Aesthetics - To the extent that nonhunting or anti-hunting people may be offended by the concept and activity of hunting, and if those persons are in deer country during the three-week hunting season, their aesthetic sense may be attended to some unknown degree. Even the presence of hunters in the field could create an impact to aesthetics as perceived by some people who don't hunt.

g. Cultural resources - No effects are known or anticipated.

D. Range Landownership - Land ownership of this herd's range is unchanged since completion of the herd plan.

E. Range Vegetation

1. Fire - In 1985, the Owens fire burned about 1,200 acres on the intermediate range of the Casa Diablo herd. This burn is now heavily weed and provides substantial benefit for spring and fall migrating deer.

2. Grazing - The effects of continued poor grazing practices, coupled with serious drought impacts, continue to degrade vegetation and soils on all seasonal deer habitats. The DFG appeal of the Inyo Forest Plan is hoped to be resolved in favor of the deer resource. New BLM planning direction may provide long-term benefits, as well.

MONO LAKE DEER HERD MANAGEMENT PLAN 1990 UPDATE

I. Update of biological data

A. Composition Counts

Year	Post-season bucks/100dd	Post season fawns/100dd	Spring fawns	Fall sample	Spring sample
1985-86	6	52	20	257	272
1986-87		no sample obtained			
1987-88	17	41	35	317	285
1988-89	22	31	--	250	--
1989-90	12	26	16	388	350

B. Buck kill

Year	1985	1986	1987	1988	1989
	359	300	135	67*	107

* This marked decline is partially due to changes in herd designations of spot kills in certain portions of the range based on new knowledge of herd parameters as revealed by telemetry research.

C. Telemetry study

In January, 1988, Hill Bill funded telemetry study of this herd was initiated with the capture of animals on their Nevada winter ranges for radio-collaring and ear tagging. A total of 71 animals were captured and eartagged; 30 were fitted with telemetry transmitter collars. The fourth interim report of study results was completed and distributed in February, 1990, providing much new information on major migration corridors, winter and summer ranges, timing of movements, predation, nutrition, hunter kills, road kills, and other facets of herd biology.

D. Collection and necropsy

During 1990, collection sampling and necropsy of Mono Lake herd does was conducted on the winter range as part of the ongoing research. Samples have not yet been analysed nor has data been compiled. Results of this work will be reported by the Hill Bill contract biologist in the near future and reports will be circulated.

II. Update of habitat improvement projects for 1988 and 1989

No habitat projects have been undertaken during the report period.

III. Other changes/additions to the herd plan --

Ten (18%) of the 55 deer initially radio-collared for the current study of this and the adjacent East Walker herd were killed by mountain lions during the first 24 months of the study. The combined efects of the severe ongoing drought and heavy predation are contributing to a suspected decline in total deer numbers. This trend is further evidenced by recent fawn ratios which are far lower than any recorded since data collection began in 1977.

State of California — The Resources Agency

MEMORANDUM

To : Mono Unit File

Date : May 27, 1991

From : Department of Fish and Game, Ron Thomas, Biologist

Subject : 1990 Deer Age Data

The following data is the result of sectioned buck teeth collected from animals taken during the 1990 hunt season in Mono County:

Zone X-12

Sample: 75

Yearling	2 yr.	3 yr.	4+ yrs.
8 (11%)	43 (57%)	20 (27%)	4 (5%)

Zone X-9A

Sample: 47

Yearling	2 yr.	3 yr.	4+ yrs.
13 (28%)	26 (55%)	5 (11%)	4 (8%)

All Mono County Herds

Sample: 122

Yearling	2 yr.	3 yr.	4+ yr.
21 (17%)	69 (57%)	25 (20%)	8 (6%)

cc: D. Pavone
K. Brown
M. Walter
L. Sitton

Please distribute to wardens.

VA 5-30-91

The preponderance of young animals in the bag reveals a relatively high rate of harvest of bucks in the herd; this evidence is supported by herd composition data which indicates a Mono County average buck ratio of 12:100 does. The low percentages of older age class animals in the bag is consistent with the relatively high harvest rates occurring; a relatively low percentage of bucks are surviving past three years of age.

Recent necropsy data indicates that all does are being bred while very low fall and spring fawn ratios in recent years reveal a high loss of fetuses and young fawns: relatively few new animals are being recruited into the populations. This fact is due to the effects of the drought on winter range forage, coupled with other factors including high predation rates (indicated by losses of telemetered animals and other field observations), known high losses to highway kills, competition with domestic livestock on key habitats, and continuing losses of critical habitats to other land uses.

Although hunter buck kill has been relatively constant, the effects of the above factors combine to create a prediction of a static or downward trend in herd populations and hunter harvests in future years. Although the return of wetter years could help to stimulate limited herd increases through increased winter range forage, the long term and cumulative impacts of the other factors may be unavoidable.

Composition Counts: Hunt Zone Totals

Zone X-12*

Year	Post Season bucks/100dd	Post-season fawns/100dd	Spring fawns	Fall sample	Spring sample
1989-90	16	20	16	1225	1859
1990-91	13	28	25	1023	1563
1991-92	22	38	25	1069	2131
1992-93	12	36		923	

Zone X-9A**

1989-90	12	22	20	1479	1711
1990-91	10	26	13	622	727
1991-92	15	24	24	909	1248
1992-93	14	42		974	

* Includes West Walker, East Walker, and Mono Lake Herds.

** Includes Casa Diablo, Sherwin Grade, and Buttermilk herds.

State of California The Resources Agency

MEMORANDUM

To : File

Date : January 25, 1993

From : Department of Fish and Game, Mono Wildlife Unit

Subject : Deer herd Composition Data

Sherwin Grade Herd Composition

year	Post-season bucks/100dd	Post-season fawns/100dd	Spring fawns	Fall sample	Spring sample
1985-86	7	35	19	691	794
1986-87	7	28	15	706	400
1987-88	10	34	12	718	307
1988-89	11	22	15	936	294
1989-90	12	31	18	572	622
1990-91	12	27	13	468	343
1991-92	12	22	22	289	378

Round Valley Herd Composition

(Beginning in 1993, herd composition data of the Sherwin and Buttermilk herds will be combined and reported as the Round Valley herd, based on current knowledge of herd parameters.)

1992-93	15	36		462	

Casa Diablo Herd Composition

1985-86	15	61	21	444	153
1986-87	6	60	39	293	602
1987-88	6	36	18	940	406
1988-89	12	18	15	159	349
1989-90	9	22	26	172	628
1990-91	6	22	13	154	279
1991-92	17	38	29	206	507
1992-93	13	49		512	

Mono Lake Herd Composition

1985-86	6	52	20	257	272
1986-87	no sample obtained				
1987-88	17	41	35	317	285
1988-89	22	31	--	250	---
1989-90	12	26	16	388	350
1990-91	14	29	34*	238	239
1991-92	18	38	24	175	472
1992-93	no sample obtained				

East Walker Herd Composition

1985-86	15	44	28	456	469
1986-87	11	48	35	170	573
1987-88	22	37	21	239	234
1988-89	9	20	17	227	333
1989-90	19	19	15	231	340
1990-91	19	30	25*	263	265
1991-92	36	39	24	251	636
1992-93	18	46		266	

West Walker Herd Composition

1985-86	10	51	32	732	2173
1986-87	14	54	31	207	999
1987-88	18	40	21	457	1421
1988-89	9	23	17	715	1042
1989-90	13	21	17	606	1169
1990-91	10	26	22*	522	520
1991-92	18	37	25.5	643	1229
1992-93	10	33		657	

* These spring fawn ratios are believed to be unrealistically inflated since the "spring" counts were conducted on February 28, before the only severe storms of the '90-91 winter which occurred in March and persisted for about three weeks.