THE EAST WALKER DEER HERD MANAGEMENT PLAN

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I. INTRODUCTION

A long-time decline in deer numbers occurred throughout California during the past 20 years, prompting the Department in 1975 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 habitat, and to provide for diversified recreational use of deer.

In 1977 the Legislature mandated the Department (Assembly Bill 1520) to develop plans for deer herd management units containing specified program elements, directing that each geographical unit of deer range will be considered distinct from adjacent ranges and that a unique management plan unit will be designed for that herd.

This document complies with the Department policy commitment and legislative mandate to describe the status and trend of the East Walker deer herd and to formulate a management program which would: 1) increase overall deer numbers, 2) improve the condition of the range, and 3) provide for high quality and diversified use of East Walker deer.

To achieve these goals, the 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. Furthermore, since much information is lacking, study results or

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 high demands for multiple commercial, residential and recreational uses, most of which tend to adversely affect the deer herd. This plan was created with input from land management agencies and local governments, for making resource allocations which will dictate the future condition of the East Walker deer herd. There are several major issues and concerns relating to management of East Walker 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 conjuction with other resource management programs.

These factors, in combination with appropriate laws, regulations and policies, were used in evaluating goals for the East Walker herd. The attainment of these goals is a long-term process and this plan is intended to be effective for a period of 10 years with a target date of 1995.

further antlerless hunts were recommended. The severe winter of 1968-69 further reduced total herd numbers. The most recent data suggests a static population at this time.

3.Seasonal Ranges and Migration.

Winter range, summer range, and generalized 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.

4.Harvest History.

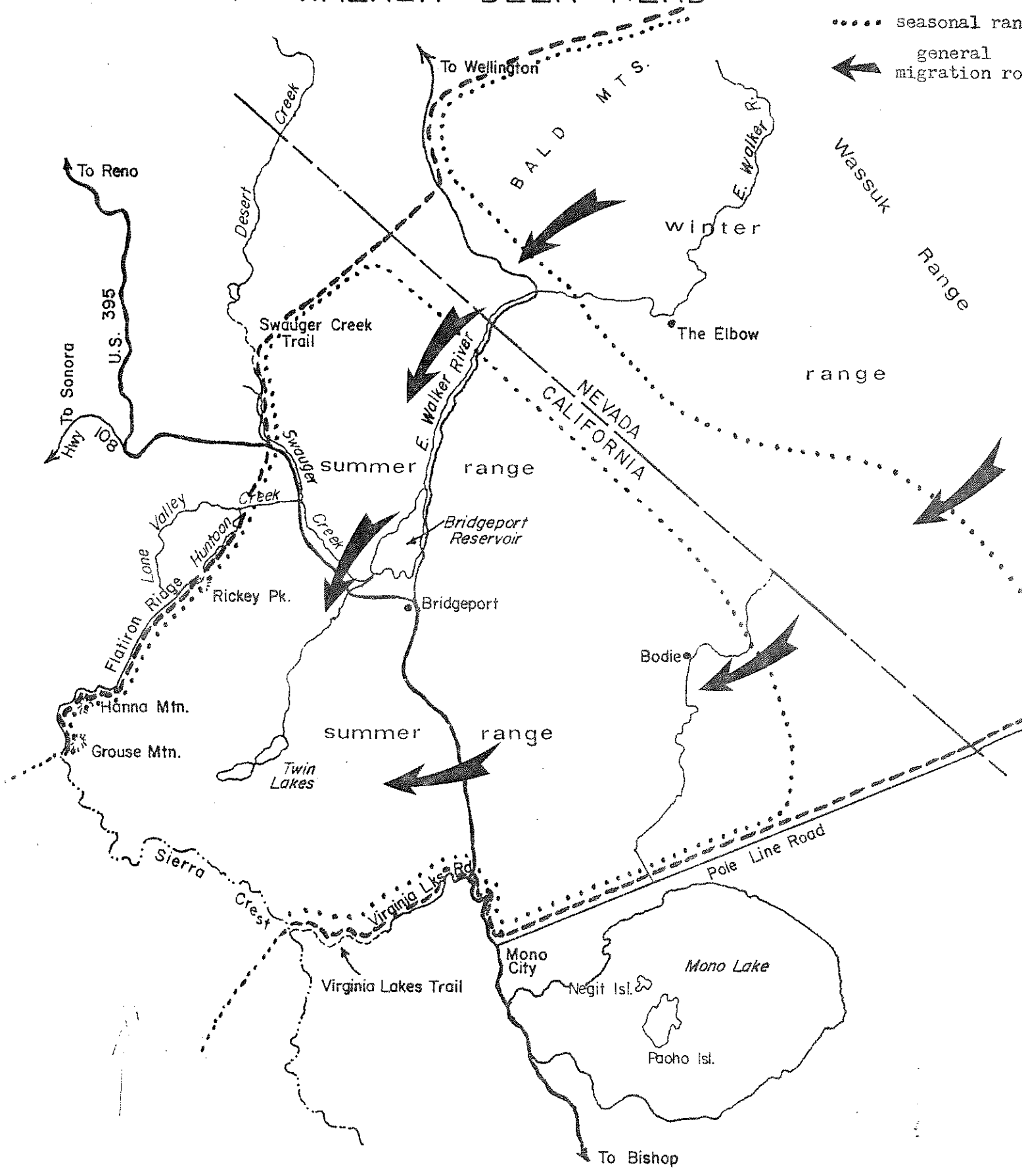
Harvest data is available from 1957 to present. Total kill averaged 734 during the late 1950's and fell to an average of 605 during the 1960's. These figures include a substantial antlerless harvest. The total harvest average fell to 233 during 1970's due to a lack of doe harvest. Buck harvest has fluctuated 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 lengthened (month-long) hunting season, resulting 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 and 1983 springs brought late inclement weather which delayed migration and provided abundant forage production. These factors created a situation favoring high buck harvest in spite of low buck ratios, i.e.; 1) many bucks migrating late,

FIGURE 1

EAST WALKER DEER HERD



summered on lower accessible ranges where feed conditions were excellent. These bucks were more available to hunters than usual. 2) 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 1983 harvest when 65% of bucks aged throughout the season were yearlings.

5. Herd Composition Records.

Herd composition counts have been conducted at intervals since 1960. Consistent counts began in 1977 when the Nevada Department of Wildlife began providing helicopter surveys of the inaccessible winter range. This data is presented in Table 1. Sample sizes have varied, but have been ample in all years. Low summer fawn production and survival is indicated by fall counts. Winter fawn losses have been moderate during 1982 and 1983. Buck ratios were severely depressed by the high 1981 harvest and continued high level of hunting pressure since.

EAST WALKER DEER HERD

Table 1

Year	Harvest		Composition Counts/100 does		
	Bucks	Doe	Bucks	Fawns	
				Fall	Spring
1957	462	237			
1958	250	240			
1959	749	266			
1960	584	207	16	29	19
1961	464	-	13	44	-
1962	529	181	11	54	-
1963	529	202	15	64	-
1964	592	315	-	-	62
1965	480	340	10	47	30
1966	476	386	-	-	41
1967	175	226	-	-	30
1968	238	-	-	-	-
1969	131	-	-	-	-
1970	206	-	-	-	-
1971	172	-	-	-	38
1972	241	-	-	-	52
1973	205	-	-	-	44
1974	173	-	-	-	-
1975	273	-	-	-	38
1976	281	-	-	-	39
1977	238	-	12	55	61
1978	237	-	10	57	37
1979	306	-	30	59	34
1980	352	-	30	59	57
1981	502	-	6	56	50
1982	208	-	6	50	34
1983	226	-	8	52	28
1984	357	-	9	55	46

6.Mortality Factors.

a.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, but no reliable estimate of lion numbers on the range is 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 East Walker deer simply because of the far greater number of coyotes compared to other predators. Again, however, the overall effect on total deer numbers is unknown.

For an in-depth discussion on the varying effects of predation and predator control, see Connolly in "Mule and Black-Tailed deer of North America" (1982; pgs. 268-285).

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 specifically prey on deer.

b.Winter Kill. Available data indicates that winter kill during recent years has been moderate but increasing. Causes are unknown.

c.Summer Fawn Loss. This factor appears to exert a major influence on the herd: an average of 55 fawns per 100 does has reached the winter range in each of the last seven years. 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.

d.Nutrition. No specific information is available relating to forage quality on the herd's range. Deer observed appear to be generally in good condition on the summer range and bucks harvested are usually in excellent condition. Nutritional factors may be involved in early fawn losses, however. The nutritional plane of deer on the winter range is suspected to be inadequate as indicated by delayed antler shedding and increasing mortality.

e.Illegal Kill. The relatively sparse human population and limited road access into much of the range suggest a low probability of poaching activity. Reports from the public and knowledge of various enforcement agencies tend to substantiate a relatively low illegal kill. However, several studies (Vilkitis 1968; Pursley 1977; Simpson 1978) have demonstrated a low chance of a poacher being detected and reported. An unknown number of illegal deer are killed and left in the field during hunting season. The total of such in-season illegal kills is believed to equal or exceed the out-of-season kill. It is difficult to determine how many East Walker deer are killed illegally each year or the total effect of such kills on the population.

f. Human Encroachment and Disturbance. Geothermal energy production, hydropower production, mining, and recreational encroachment are significant factors affecting the herd. Mining interests are continually prospecting in the Bodie Hills which is historic key summer range and currently important transition range. Numerous new roads have resulted, to the detriment of deer and other wildlife. Interest in geothermal energy in the Bodie Hills continues, although the future of that resource use is uncertain.

Most of the herd's range is public land heavily used by recreationists; disturbance of deer results especially on summer fawning habitats. In the back country, 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 developments within the herds range. Such encroachments have a high potential to degrade deer habitats through disturbance and impacts to riparian vegetation.

g. Livestock Grazing. Heavy grazing pressure begins during the fawning period on much of the key fawning habitat used by the herd. Historic fawning areas in the Bodie Hills are particularly heavily grazed; early sheep use of needed riparian types occurs in many other areas as well.

B. Herd Range Description and History.

1.Topography, Soils, Climate.

The herd's range extends between elevations from about 5000' on wintering areas in the Excelsior Range (Nevada) to well over the 10,000' elevation on the Sierra west slope and crest.

The range area 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, and of low value as deer habitat.

The soils of the summer range have been described as being shallow to moderately deep (10-40 inches) and generally having a sandy loam texture. Rock content varies from 0-95%, with the steeper slopes usually more rocky. Water retention capability tends to be low and in inverse proportion to rock content. Much of the eastern Sierra escarpment is a massive granitic barrier.

Soils on the winter range are highly erodable decomposed granite with an intermixing of sandy loam, generally shallow and rocky.

The climate of the unit is characterized by heavy snowfall and low temperatures from December through April. Average annual precipitation is approximately 60" at 10,000 feet and about 10" at 5,000 feet. Most of the precipitation is in the form of snow, but winter rains are common at the lower elevations and summer thunder storms are common at higher elevations.

2.Range History.

Early reports by explorers including Walker in 1834, Fremont in 1884 and Von Schmidt in 1856 indicated sparse game populations (primarily bighorn and antelope) in the general region. The mining industry stimulated development in Mono County 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 gazing of the bunch grass virtually eliminated the antelope and bighorn. Bunch grass ranges were converted to browse, largely bitterbrush and sage, increasing available deer feed and prompting a gradual increase in deer numbers until the 1930's.

Grazing restrictions on the 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 1950's.

3.Land Owenership.

Approximately 90-95% of the herds range is public land administered by the U.S. Forest Service and Bureau of Land Management. (Figure 2). Generally, the small private fraction of the herd range is not primary deer habitat, except for some good habitats in the Bodie Hills and scattered holdings in the Sierras.

4.Current Grazing Use.

As on most public lands, the demand for grazing use here is high. As evidenced by the grazing seasons and numbers of A.U.M.'s in Tables 2 and 3 there exist considerable opportunities for competition between livestock and deer. This is especially true on summer ranges during fawning and on important upper elevation habitats in the Bodie Hills.

Table 2 below presents current BLM range allotment data.

Table 2

Allotment/Number	Stock	AUM's	Season
Dog Creek/6058	Sheep	990	6/1-10/31
Rancheria Gulch/6059	Sheep	1600(17 for deer)	6/1-10/31
DeChambeau Ranch/6060	Sheep	600	6/1-8/15
Mono Settlement/6061	Sheep	240	6/1-10/31
Travertine Hills/6062	Sheep	740	5/17-8/15
Little Mormon/6070	Sheep	1230	6/1-10/15
Bodie Mtn./6071	Cattle, Sheep	5647	6/1-10/15
Mono Sand Flat/6072	Cattle	2514	12/1-5/31
Potato Peak/6073	Cattle, Sheep	3892	6/1-11/20
Mormon Ranch/6074	Sheep	329	6/1-11/15
Goat Ranch/6075	Sheep	164	6/1-7/20
Green Creek/6076	Sheep	550	6/9-10/31
Aurora Cyn./6079	Cattle	1736	6/16-9/30
Squaw Creek	Cows, horses	178	10/15-3/31(on deer winter range)
Garfield Flat	Cattle	4241	10/15-4/15(on deer winter range)

Table 3

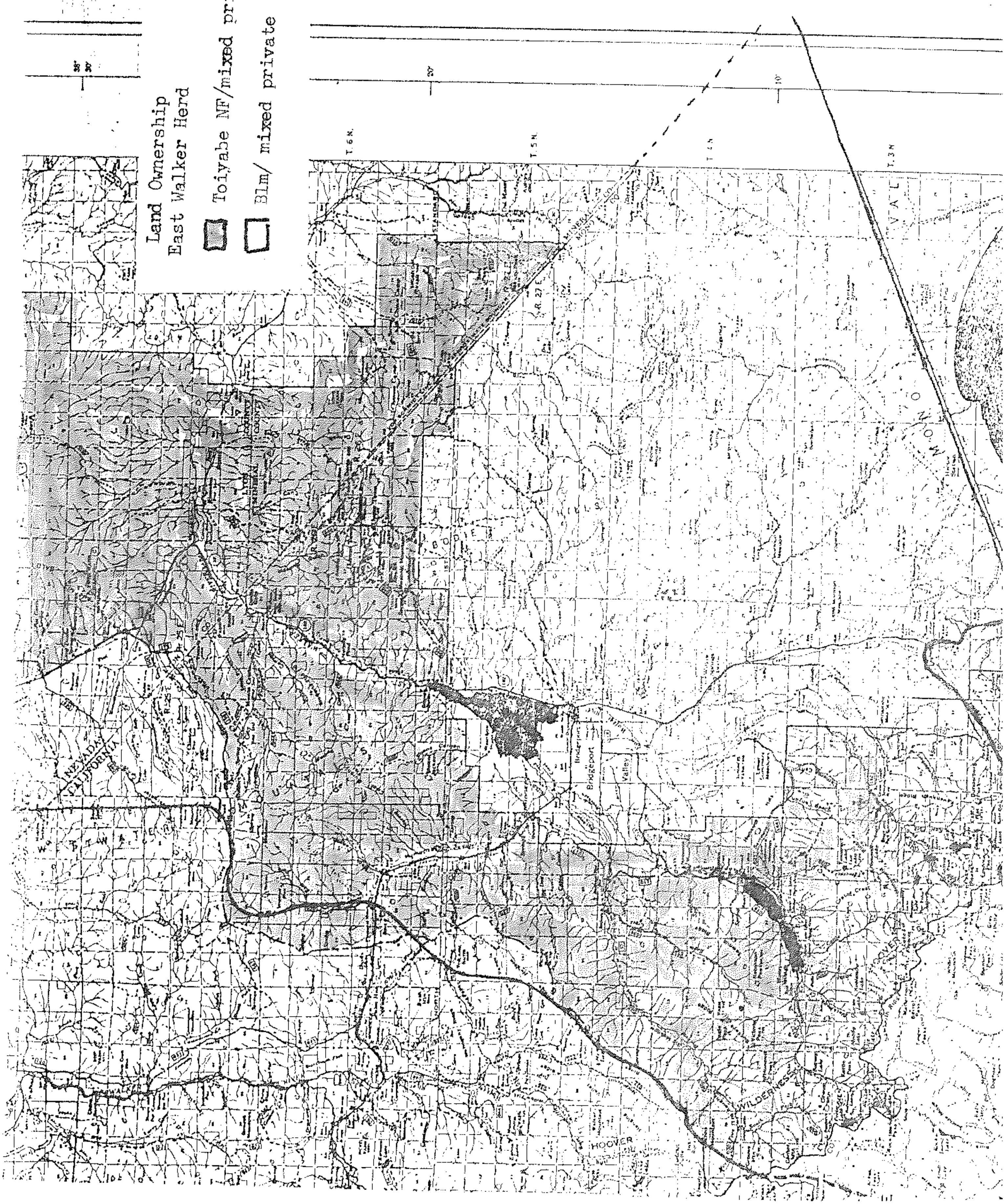
U.S. Forest Service Livestock Allotments
and Permitted Use Within the East Walker Deer Herd Range

Allotment	Deer Range* Type	Stock	Permitted No.	Season of Use	AUM
Rickey Peak	S	sheep	750	6/16-9/25	812
Buckeye	S	cattle	178	6/21-9/15	665
Eagle Cr.	S	cattle	150	7/16-9/15	308
Tamarack	S	sheep	750	7/10-9/30	8112
Cameron	S	sheep	750	7/11-9/30	812
Green Cr.	S	sheep	26	6/16-10/31	35
Dunderburg	S	sheep	750	7/10-9/30	812
Virginia Cr.	S	unallocated	-	-	99
Summers Mdw.	S	sheep	300	6/16-10/31	360
Hunewill Hills	S	cattle	75	6/1 -6/30	158
Robinson Cr.	S	cattle	3	6/1-10/15	17
South Swauger	S	sheep	900	7/1-9/10	631
Sierra Blanca	S	sheep	367	6/16-9/15	292
North Swauger	S	sheep	854	7/11-8/10	257
Mt. Jackson	S,I**	cattle	76	6/16-10/15	351
Frying Pan	S,I**	cattle	208	6/26-9/30	869
Sweetwater	S,I	cattle	1007	6/15-10/15	5200
Judge Chambers	S,I	cattle	25	6/16-10/14	66
Desert Peak	I	sheep	1025	5/21-6/15	256
Masonic	S,I**	cattle	80	7/1-9/15	370
Rough Cr.	S,I**	cattle	33	6/1-10/15	150
Conway	W**	cattle	93	12/11-3/20	238
Bald Mt.	I,W**	sheep	900	5/16-7/15	540
Nye Canyon	I,W	cattle	40	6/16-9/15	20
Wichman	W	cattle	11	12/1-3/31	45
Rockland	W**	cattle	85	12/1-3/31	340
Sulpher	I,W	sheep	825	1/5-2/28	297
Pine Grove	I,W	sheep	1000	5/5-6/3	590
Pine Grove	I,W	sheep &	825 &	1/5-2/28	-0-
Powell Mtn.	W**	cattle	133	6/1-10/15	789
Larkin Lake	W**	cattle	40	11/1-5/1	40
TOTAL					29,369

* S represents summer range, I intermediate and W, winter.

** represents allotments with known key fall or winter holding areas.

Figure 2


Land Ownership
East Walker Herd
Toiyabe NF/mixed private
Blm/ mixed private
BODIE
Bridgeport
Valley
NEVADA
CALIFORNIA
WILDERNESS
HOOVER

spp.), Rushes (Juncus spp.), and Cinque foil (Potentialla spp.).

Basins with a mixture of forest, browse and riparian habitats provide favored deer use areas and are also heavily used by recreationists. Surface water is abundant throughout the summer range.

C. Major Factors Regulating The Population

There are numerous interacting factors which regulate a deer population. They are complex and interrelated, and the additive effects of several can combine annually 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 influence and environmental influences. Undoubtedly, the most profound influences on deer fall into the first category. These include such factors as livestock grazing, hunting, recreation, highway traffic and land developments for residential, mining, hydroelectric or other purposes. Environmental influences include weather and predation.

1. Human Influences

a. Livestock As previously mentioned, 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, 1979). This research found deer use to be 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 are seriously depleted, which can cause soil damage and erosion. 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 of improper grazing programs on deer. 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.

In the Bodie Hills especially, and on some key areas in the Sierras, cattle and sheep grazing is reducing or eliminating deer habitat suitability.

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. 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 could and should be managed, with or without grazing, to maximize values for deer and other wildlife.

b.Hunting Hunting of bucks is presently the major consumptive utilization of East Walker deer and is a major factor influencing buck numbers and their 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, migration, and a dramatic increase in hunter take.

Buck ratios were severely reduced and have remained very low since 1981 due to continued heavy hunting pressure and low recruitment This trend was facilitated during the 1982 and 1983 hunting seasons when, due to climatic and feed conditions, harvest remained high in spite of low buck ratios. During these years, late spring storms delayed migration, yet provided excellent feed

at lower elevations. Many bucks remained on these accessible ranges summer long and were readily available to hunters. In addition, many yearling bucks grew forked antlers due to good feed conditions and these inexperienced bucks were easily taken and made up the majority of the bag in some areas.

Antlerless hunts were conducted from 1957 to 1967, except in 1961. Seasons varied from three days to six weeks in length. According to the spot kill maps available, the doe harvest was concentrated in the Sweetwater Mountains and the vicinity of Rickey Peak to Buckeye Creek.

Summer deer numbers are low in the Sweetwaters at present. Removal of a high number of does from such summer habitat, and subsequent failure of does to recolonize those fawning habitats may depress future populations in such an area.

Crippling loss of legal deer 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.

c.Road Kill Twice each year most deer in this herd must cross at least one major highway (U.S. Route 395). A substantial but unknown number are struck and killed by vehicles. Such collisions represent a public safety hazard, expense to motorists, and trauma for individual deer, but the effects on the total population are not known.

d.Encroachment on Habitat.

1) Mining and Geothermal Development.

The demand exists for mining and geothermal exploration and

development activities, especially in the Bodie Hills where several applications are currently on file. Such exploration, with or without development, presents marked impacts to wildlife in the form of disturbance, increased road access, use of needed wildlife water, and direct habitat destruction. Unfortunately, initial exploration, which often has serious impacts,may not be required to describe effects through the Environmental Impact Report process. Resource agencies are therefore unable to affect impacts to wildlife from such projects.

2) Recreational Uses.

Campsites in meadows and along stream courses are highly favored. Therefore, some of the many campgrounds (whether developed sites or unimproved areas) within the herd's range have encroached on important deer habitats.

Dispersed recreational use of the intermediate/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.

3) Residential Development.

Since the bulk of the range is public land, residential development is not a major threat to this herd. Still, in certain areas, the threat of housing exists. In one such area near Bridgeport, a project would have subdivided key deer habitat to small lots. Constraints imposed for wildlife have apparently forstalled the project, for the present, at least. In an effort to provide advance notice to planners, engineers, and landowners, current DFG efforts are concentrated on

delineating specific key habitats throughout the county. As such delineations are completed (through telemetry studies or other means) they are provided to planners and will be appended to this plan. The County Planning Commission feels this to be the most positive means to reduce further impacts from development.

4) Hydroelectric Projects.

There are currently several applications on file for construction of small hydroelectic projects within the range of the East Walker herd. Potential impacts to the herd vary from nearly negligible to significant, depending on type, size, and location of the project. Coordination with land managing agencies and local governments is ongoing to attempt to minimize adverse effects. Careful evaluation of each site will be necessary to protect wildlife resources.

2.Environmental Influences.

a.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 migration; such a delay also creates stress and can reduce fawning or recruitment that year.

Other, more subtle 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 apparently 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. Migrations, in particular, generally held to be habitual, 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 East Walker deer hunting season. An early storm, coupled with a lack of feed at higher elevations due to low precipitation the previous year, prompted deer to migrate to such an extent that essentially the entire herd was accessible to hunters. An exceptional harvest 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, as in the 1982 season. Late spring storms delayed migration and affected buck antler growth and harvest during 1982 and 1983, as discussed previously.

Free water is abundant throughout most of the range of the East Walker herd, but prolonged drought can reduce availability of water. Another pronounced effect of drought conditions is reduction or absence of annual browse and forb production.

Summer thunderstorms can be locally important to East Walker deer by providing for young herbaceous forage through the summer months and even into fall. Weather can affect predation. It has been theorized that dry years reduce the alternative prey base

for coyotes, so fawns are subjected to heavier predation (Smith and LeCount 1976).

Cover for fawns is reduced by dry years; this would increase their vulnerability.

b. Predation

The precise influence of predation on the East Walker 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 the population. Conversely, predation by coyotes or mountain lions has never been documented as the principal cause of a mule deer decline (Connolly 1981).

Since fall fawn ratios are low, it is likely 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 also probable that current protection of mountain lions from sport harvest is resulting in increased lion populations and increased take of deer by lions.

III. POTENTIALS FOR RESTORATION AND MANAGEMENT UNIT GOALS.

A. 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 restoration; (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 East Walker herd winter range most of 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 3,156. The high population level was reached in 1964, estimated at 7,669; the low was in 1970 estimated at 743. The goal of future management was established at 5,050 animals which represents a 60% increase over the past 10 year average and about a 66% increase over the current 1984 estimated population of 3,042.

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 historical summer ranges are currently receiving little or no deer use; evaluation and management of such habitat is indicated, especially in the Bodie Hills.

Deer numbers have apparently decreased somewhat since Nevada's 1978 report was issued. Any increases will require diligent habitat and harvest management, since it is believed that the herd is near the carrying capacity of some seasonal ranges. Increases in deer numbers can only be expected through improved habitat condition, 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, so improving habitats is in the best interest of that stability. We cannot realistically hope for improvement of habitats throughout Mono County however. 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.

B. Attainable Levels of Restoration

The current population, calculated using Selleck-Hart methodology, is estimated at 3,000 animals. Mining, hydroelectric energy, and livestock grazing impact the herd considerably, and recreation impacts have somewhat reduced deer habitat quality. However, the key ranges are intact and winter range quality is believed to be stable, if less than optimum.

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, in agreement with Nevada's goal stated in 1978, is 5,000 deer.

C. Utilization Levels and Alternative Strategies.

At present, only forked horn or better bucks are harvested with a 3,000 tag quota for Zone X-12 which encompasses the East and West Walker herds. Post season buck ratios during the past 2 years (6-8/100 does) reveal that a maximum buck kill is occurring. This very low buck ratio is the result of heavy harvest during 1981 and low recruitment and continual heavy harvest duirng 1982, 1983 and 1984.

Such intensive harvest of bucks has certain drawbacks. The average age of animals killed is related inversely to the size of the harvest (Connolly 1981). Large, older animals are almost absent in the harvest, since nearly all bucks killed are less than 3 years of age. In fact, 65% of 170 bucks aged throughout Mono County throughout the 1983 hunting season were yearling animals. Other field studies (Brownlee 1975) and computer modeling (Gross 1973; Anderson et al,1974) have demonstrated this decline in high quality 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 by some professionals and the public. Nevada DOW bilogists share the concern about this preponderance of yearlings, believing that

genetic advantages result from breeding by older, robust, more mobile bucks, known to have traits for large body and antler size. Recent studies of the genetics of white-tailed deer substantiate this premise (Mott, 1980).

Hunters have frequently expressed the desire to see some older, bigger, trophy class animals. Considering this very low buck ratio and its possible effects, good biological management should be directed toward increasing that ratio.

Current seasons are three weeks in length, with a 3,000 tag quota for the 2-herd zone. Buck ratio increases are hoped for through the continued three-week season with controlled levels of hunting pressure.

The current strategy of buck utilization is the quota permit system, allowing hunter numbers to be adjusted annually. Hunter pressure is decreased initially, success rate is increased and buck ratios could be increased. Subsequent buck hunter quotas can be adjusted in response to changes in buck ratios.

In 1985, antlerless hunting of the East Walker herd is being conducted in Nevada without concurrence of the California Department of Fish and Game. This writer is concerned about negative effects on portions of the deer population when limited segments of the total population are hunted selectively. A random disribution of take from all herd segments is believed to be safer biological strategy. Such may not be the case under current Nevada strategy. No antlerless harvest is currently recommended in California.

D. Preferred Levels of Restoration and Utilization.

In formulating the preferred goal, a number of criteria were considered: (1) social acceptance and support; (2) economic factors, both costs and benefits of implementing restoration, (3) tradeoffs with other land uses; (4) current and projected demand for uses of deer.

1. Herd Goals	Current	1994 Target
a. Fall Population Size	3,000	5,000
b. Herd Compositon		
Bucks/100 Does	6-8	20
Spring fawns/100 Does	37	50
c. Total Hunting Harvest		
Bucks	270	450 (+66%)
Antlerless	0	0

d. Flexibility in harvest level to attain and maintain stated goals. Variability in buck and antlerless season timing, length, and/or tag quotas is required to achieve such flexibility.

2.Habitat Goals.

	Current	1994 Target
a. Average deer density on summer range (200 sq.mi.)	15/sq.mi.	25/sq.mi.
b. Average deer density on winter range (100 sq.mi.)	30/sq.mi.	50/sq.mi.

c. Improve current habitat conditions and reduce competition and disturbance on key summer/intermediate habitats.

d. Improve current habitat conditions and reduce disturbance on the winter range.

IV MANAGEMENT PROBLEMS.

1. Summer range composition counts are lacking.

2. Summer range forage quality and quantity is unknown.

3. Competition between deer and livestock on the summer and intermediate range is poorly understood, but is known to be detrimental to deer, especially in the Bodie Hills.

4. Key habitats on interstate and summer ranges are not identified.

5. High fawn mortality occurs during the summer, fall, and winter.

6. The nutritional plane of wintering deer is unknown.

7. Recent harvest strategies allow heavy hunting pressure; mature bucks in the herd have diminished.

8. Low buck ratios reduce hunting success and may affect breeding success.

9. Future residential developments may impact intermediate ranges.

10. Backpacking and other summer recreational uses disturb deer.

11. Uncontrolled domestic dogs harrass deer on some range areas, especially areas of summer range frequented by backpackers.

12. The dense network of roads in the Bodie Hills creates disturbance to deer and contributes to the lowered deer use there.

13. Wild horses and burros compete with deer on some areas of winter range and this competition may be increasing.

14. The effects of mining and geothermal exploration on the herd and habitat are detrimental.

15. Future hydro-power projects may impact summer and intermediate habitats.

16. Funds are not annually assured to conduct aerial herd composition surveys.

17. Limited regeneration of bitterbrush is occurring on the winter range.

18. Interstate coordination of harvest management needs improvement.

V. MANAGEMENT PROGRAMS, OBJECTIVES, AND PRESCRIPTIONS

A. Inventory and Investigative Element.

1. Routine Data Collection and Application.

Basic data indicating herd performance has beeen collected annually. Due to the inaccessible nature of the winter range, fall and spring herd composition count samples are very difficult to obtain on the ground. Recently adequate composition counts have been accomplished using helicopter flights provided by Nevada Department of Wildlife and/or the Mono County Fish and Game Advisory Commission and California Department of Fish and Game. Loss of such aerial surveys would seriously impair data quality.

Periodic surveys of summer ranges to investigate fawn production and survival, range quality, disturbance, competition, and key habitat data are sorely needed. The lack of roads in rugged, inaccessible terrain inhibits such data collection.

Total reported kill is compiled by tag returns each year and is a good indicator of harvest trend. During recent years, a hunter check station has been operated on opening and closing weekends to evaluate hunting pressure, success, and to obtain buck age data. Continuation of this effort is needed to provide representative data.

2.Research Needs.

a.Key Habitats The well-being of a migratory deer herd depends on habitat quality on all seasonal ranges. Problems on any key habitat may affect the reproductive ability and health of the animals. The first step in preserving or improving habitat quality is identification of all habitats and their condition.

Key deer use areas in Nevada are well known; it is uncertain, however, which herds use which winter ranges; since 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 helicopter, 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 herd movements and habitat locations. Habitat quality is then determined by on-the-ground surveys.

b.Summer Fawn Losses. Over the years, data has indicated a significant loss of fawns before fall compostion counts (7 year average fall fawn ratio: 55 fawns : 100 does). Intensive research is needed to identify specific causes of this early fawn mortality.

c.Nutrition. There are indications of nutritionally stressed deer on East Walker winter ranges from sightings and delayed antler drop. Collection and necropsy of debilitated animals is needed. Food habits work and range quality assessments in problem areas are indicated as necessary. Identifying deficiencies and causes of these problems would suggest measures to relieve stresses and benefit herd vigor and recruitment. Diaminophosphoric acid

(DAPA) analysis of fecal pellets offers an experimental method of assessing digestible protein in the diet. Determination of levels of selenium and other vital trace elements through blood analyses is also recommended whenever blood samples can be obtained.

3.Public Attitudes.

It should be noted that concern by the hunting and local public for the welfare of the deer herd reinforces the need for research of this valued resource.

4.Inventory and Investigative Programs.

Objective: Gather and evaluate herd life history and trend data, and identify key habitat locations and apparent trend. This would allow the making of ecologically sound, socially acceptable management recommendations and decisions.

a. Inventory.

1) Continue to monitor basic herd performance indicators.

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

b) Size of hunting harvest: Check stations on opening and closing weekend, tag tally.

c) Age class structure of the buck kill: continue opening and closing weekend check stations and aging animals throughout season.

d) Spot kill mapping.

2) Additional monitoring recommended:

a) Aerial and/or ground summer composition counts and habitat surveys.

b) Hunting pressure evaluation: Survey opening weekend.

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

d) Monitor livestock, wild horse and burro use.

b) Research Investigations Needed.

1) Comprehensive radio telemetry study to define key areas, migration routes, and herd boundaries.

2) Fawn survival and mortality study.

Evaluate fawn losses in conjunction with above telemetry work.

3) Blood serology and nutrition research, especially to define levels of selenium and other trace minerals. This should include disease and parasite study.

4) Investigate means of winter range forage rejuvenation by revegetation, fire, fertilizing, etc.

5) Evaluation of public attitudes and concerns could be accomplished through public tours and seminars, Board of Supervisors meetings, Wildlife Advisory Commission meetings, etc. These steps would explore the social acceptability of investigations and management direction.

B. Herd Management and Mortality Control Element.

Herd management will aim for a stabilized population of about 5,000 animals, a 66% increase. Problems of sex ratio and buck age class structure exist in the herd. Low buck ratios reduce hunting success and 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 affect buck ratio and buck age distribution.

Herd composition data shows recruitment problems to 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 and other aspects. Highway mortality takes an undetermined number of East Walker deer each year. Some data is

available regarding key deer highway crossings. More information on major crossings is needed. Improved warning signs or other measures are needed.

1.Herd Management and Mortality Control Programs.

a. Herd Size.

1) Objective: Maintain in healthy condition an average population of 5,000 animals. This represents about a 66% 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.

2) Methods:

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

b. Maintenance, improvement of winter range condition productivity.

1. Experimental fertilizing, burning, planting.

c. Influence livestock, wildhorse, and burro management to reduce competition.

d. Sex ratio of the breeding population.

1. Objective: Attain and maintain a post hunt buck:doe ratio of 20:100 over the long term.

2. Methods:

a. Vary season length and timing and/or hunter quota levels to reduce buck harvest.

e. Age Class Structure of the Population.

1. Objective: To attain a pre-hunt buck population

containing a minimum of 40% 3 year and older animals; to provide a reasonable opportunity for harvest of trophy class (4 point) animals.

2. Methods.

a. Initial reduction of buck harvest to attain goal.

b. Subsequent annual adjustments in harvest to maintain goal level.

f. Fawn Recruitment Rate

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

2. Methods:

a. Identification and enhancement of key habitats.

b. Identification of disturbance and other factors reducing fawning success.

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

d. Improvement of winter habitat.

b. Mortality Control.

(1) Objective: To reduce highway mortality of deer.

(2) Methods:

a. delineate major deer crossings

b. improvement of warning measures and other public information.

c. removal of roadside vegetation at major crossings.

C. Habitat Element.

1.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/or climatic shifts (Buckhart and Tisdale 1976) and 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 habitat 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 herd is lacking. For more detailed discussion and references on pinyon-juniper and bitterbrush, see the DFG West Walker Herd Plan (1984).

2.Conflicts With Other Resource Management Programs.

a.Grazing. Livestock grazing is the most significant land use influencing deer habitat. Livestock are grazed on all seasonal ranges of the herd. Timing and/or concentration of large numbers of domestic animals can lower forage carrying capacity for deer and other wildlife. Disturbance by livestock has been shown 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 (especially areas above 8000' elevation)to provide for early forage and cover needs of fawning does, (b) discouraging or preventing livestock concentrations in key habitats, (c) reducing allotment quotas. The new Coordinated Resource Management Planning (CRMP) effort in the Bodie Hills offers one means to reduce livestock impacts.

b.Wild horses and Burros. A number of feral horses and burros utilize the herd's winter range. The effects of these animals on range and wildlife resources is now being analyzed through U. S. Forest Service planning procedures. Minimizing the detrimental impacts through management and populations control will be the goal of this effort.

3.Land Use Conversions. Since the majority of the herd's range is publicly owned, the threat of extensive land use conversion is less severe than on other herd ranges. However, the existence of many private land parcels scattered throughout the range creates the possibility of future housing or other developments. In addition, considerable interest in mining and geothermal energy in the Bodie Hills has the potential to result in land conversion on that large area of valuable range.
Other unforeseen developments are likely as well, due to expanding human uses throughout Mono County. Unfortunately the Mono County planning process often gives inadequate consideration to natural resources. Projects are often approved for political reasons while resource considerations are subordinate.

4.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 uses are often situated in good or key deer 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 to 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 hydropower projects have been proposed and planned on the herd's summer range (eg. Virginia Creek) These projects have potential for severe impacts to fisheries, wildlife, and their habitats.

Habitat Management Programs

a. Objective: To attain and maintain habitat quality sufficient to achieve the stated herd management objectives.

b. Methods:

(1) Identify key seasonal habitats and any deficiencies therein (see Research.)

(2) Evaluate winter range quality regarding pinyon-juniper encroachment; make recommendations.

(3) Continue to investigate bitterbrush quality and means of rejuvenation.

(4) Influence planning to minimize impacts by developments, especially in the Bodie Hills.

(5) Where habitat is deficient, rehabilitate key areas (aspen groves, meadows, riparian zones, migration corridors) by assessing livestock or other impacts. Reduce any such impacts through changes in livestock season of use, exclosures, herding improvements, reduction of grazing quotas, etc.

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

(7) Review all hydro- power proposals, conduct surveys, provide recommendations to safeguard wildlife resources.

(8) Reduce disturbances to deer on the summer range through public education and/or regulations, especially backpackers and dogs.

(9) Influence USFS campground planning to minimize impacts to wildlife habitat.

(10) Participate in resource planning efforts in the Bodie Hills (CRMP).

D. Utilization Element.

1. Harvest Strategies and Public Attitudes

Currently only bucks (forked horns or better) are harvested with a X-12 zone tag quota of 3,000. Since the record harvest in 1981, composition counts have indicated that a maximum buck take is being achieved (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 indicated at present. Subsequent to attainment of herd goals, buck harvest can be adjusted annually to maintain stated goal levels.

Active means of reducing the East Walker buck harvest were initiated in 1985 through a tag quota. The herd tag quota system should provide the most direct means of reducing buck take. This would rapidly increase and maintain the buck ratio by annually adjusting the hunting pressure in response to observed herd composition.

When management programs succeed in increasing the buck ratio, future harvest strategy 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 adamant approval of, or opposition to, changes in strategies. 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 actually requested buck tag quotas, 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.

2.Nonconsumptive Utilization

Casual viewing and photography of deer at all seasons on all ranges constitutes the major non-consumptive 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 are substantial and increasing.

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

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.

3.Utilization Program

a. Objectives: Provide for maximum consumptive utilization of East Walker deer consistent with sustained yield and with achievement of stated herd goals. Maintain herd size in balance with existing habitat conditions and to achieve equitable sex and age ratios. Increase and maintain prize bucks in the bag. Continue to provide for a level of non-consumptive use which satisfies demand, and increase information to the public.

b. Methods:

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

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

E. 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 encourage 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 agencie (county sheriff, USFS, etc.)

Expand patrol efforts to include back country areas.

Advertise the CalTip program.

F. Communication of Information Element.

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 managing agencies and key factions of the public. Announcement of the plan (and its availability) in local newspapers is recommended. Updated information (i.e. research results) should be announced as well. Other means of communication and soliciting public response can be developed as needed. A leaflet form of summary of the plan should be prepared for wide-spread distribution.

Increases in education of hunter ethics and information on CalTIP is recommended by enforcement personnel.

1. Communication of Information Program

a. Objective: Provide the public with as much information as practical regarding the East Walker herd.

b. Methods:

1. Utilize local media and/or regional outdoor publications to publicize newsworthy information.
2. Develop a summary of the herd plan for publication.
3. Attend governmental meetings and conduct public briefings to convey information on the herd and plan.
4. Place copies of completed plan in local libraries.
5. Inform public of CalTIP program.

6. Create narrative display(s) on Highway 395 to increase public information.

G. REVIEW AND UPDATE

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

2.Methods:

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

b. Incorporate annual data in plan appendices.

c. Use new information (research results, herd performance data, etc.) to update the plan as needed.

VI. ALTERNATIVES

Explicitly stated in the legislative mandate and policy commitment for deer herd planning is the requirement to address alternatives to preferred goals.

A. Deer Management as Currently Exists

The aim of this alternative would be to maintain the status quo in management of the West Walker herd. Current data collection would continue; no new research or data collection efforts would be undertaken. No new habitat programs would be instituted. The herd would remain at current size or would decrease in response to habitat losses. The harvest strategy would remain bucks only, 2 point or better, with unlimited hunter numbers. Such buck harvest would continue to cause low buck ratios.

This alternative was not selected for the following reasons:

1. The alternative does not meet the long-standing herd goal agreed upon by the Nevada and California fish and game departments.

2. The restoration and maintenance of California deer herds is mandated by the Legislature (AB 1521). Even partial restoration to former herd size will require intensified management.

3. Public opinion, demand (present and projected) and economics dictate emphasis on deer management and enhancement of this herd. Deer are a valuable resource which contribute significantly toward the quality of life and economic stability of Mono County.

B. Management for Maximum Habitat Productivity and Maximum Sustained Deer Yield

Attainment of the goals of this alternative would yield a dramatic increase in habitat quality for deer and many other wildlife species. Fawn survival and recruitment could double or triple. Deer numbers could increase dramatically, as much as 100 percent. Hunter capacity and success would soar. Either sex hunts would be necessary.

This alternative was not selected for the following reasons:

1. Designating the deer resource or any other single rsource to receive top priority in all land management decisions would be in direct conflict with BLM and USFS multiple use policies.

2. The costs associated with such an intensive habitat program would be prohibitive.

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East Walker Deer Herd Plan

Annual Update - 1985

I. Standard routine data collection was performed during 1985 including post-season and buck age data, spring composition counts, harvest data, and relative hunting pressure assessment through opening weekend field survey. That field survey and other informaiton indicate severely reduced pressure in this herd area this year due to the fact that most hunters in the new X-12 zone chose to hunt the adjacent West Walker herd. Buck ratios in the East Walker herd rose significantly as a result.

Composition Counts

Year	Post-Season bucks:100 does	Post Season fawn:100 does	Post-Season Sample	Spring fawns	Spring Sample
1983-84	8	52	260	28	329
1984-85	9	55	229	46	774
1985-86	15	44	456	26	469

Harvest

Year	Kill
1983	226
1984	348
1985	319

Buck Age Data
(Collected Season-Long)

Year	Yearling	2 Years	3 Years	4 Years
1985	16 (21%)	39 (51%)	14 (18%)	8 (10%)

II. No habitat improvement projects undertaken in 1985.

III. No major changes to the plan in 1985.

EAST WALKER DEER HERD

Table 1

Year	Harvest		Composition Counts/100 does		
	Bucks	Doe	Bucks	Fawns	
				Fall	Spring
1957	462	237			
1958	250	240			
1959	749	266			
1960	584	207	16	29	19
1961	464	-	13	44	-
1962	529	181	11	54	-
1963	529	202	15	64	-
1964	592	315	-	-	62
1965	480	340	10	47	30
1966	476	386	-	-	41
1967	175	226	-	-	30
1968	238	-	-	-	-
1969	131	-	-	-	-
1970	206	-	-	-	-
1971	172	-	-	-	38
1972	241	-	-	-	52
1973	205	-	-	-	44
1974	173	-	-	-	-
1975	273	-	-	-	38
1976	281	-	-	-	39
1977	238	-	12	55	61
1978	237	-	10	57	37
1979	306	-	30	59	34
1980	352	-	30	59	57
1981	502	-	6	56	50
1982	208	-	6	50	34
1983	226	-	8	52	28
1984	357	-	9	55	46
1985	319	-	15	44	26

State of California

The Resources Agency

Memorandum

To : Wildlife Management

Date : September 24, 1987

From : Department of Fish and Game

Ron Thomas

Subject : East Walker Deer Herd Plan Update - 1986

I. Zone X-12 (East Walker and West Walker Herds) hunting pressure was reduced in 1985 to 3,000 tags; this quota was unchanged in 1986. However, in 1986 it was apparent that much of the pressure shifted from the West Walker herd to the East Walker; consequently, buck ratios fell in the East Walker.

Composition Counts

Year	Post Season Bucks/100 Does	Post Season Fawns/100 Does	Post Season Sample	Spring Fawns	Spring Sample
1985-86	15	44	456	26	469
1986-87	11	48	170	35	573

Harvest

Year	Bucks
1985	319
1986	399

Buck Ages

Yr	2yr	3yr	4+
20(23%)	43(50%)	13(15%)	10(12%)

II. No habitat improvement projects undertaken in 1986. On the contrary, efforts to reduce the impacts of heavy grazing to important habitats in the Bodie Hills (BLM lands) through the Coordinated Resource Management Planning (CRMP) process have failed totally due to the nonresponsiveness of BLM Bishop District Management.

III. Recommendations have been formulated for a 50% tag reduction (to 1,500 for Zone X-12) to attempt to reduce harvest and stimulate significant buck ratio increases. The reduction would be effective in 1987.

Ron Thomas

Ron Thomas
Wildlife Biologist

cc: V. Bleich, J. Davis

State of California The Resources Agency

Memorandum

: Wildlife Management, Region 5 Date : October 14, 1988

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

Subject: East Walker Deer Herd Plan Annual Update, 1987-88

I. Zone X-12 (East Walker and West Walker Herds) hunting pressure was reduced from 3,000 tags to 1,500 tags in 1987. The buck ratio rose substantially:

Year	Post Season Bucks/100dd	Post Season Fawns/100dd	Post Season Sample	Spring Fawns	Spring Sample
1986-87	11	48	170	35	573
1987-88	22	37	239	21	234

Fawn ratios declined largely due to current drought conditions.

Harvest

Year	California	Nevada	
		Buck	Ant.
1986	399	29	22
1987	169	61	31

Increases in Nevada harvests offset somewhat the goal of reducing California take.

II. No habitat improvement projects undertaken in 1987.

III. Major Changes to the Plan: None. Major telemetry research on this herd was initiated in early 1988; management direction changes may be recommended in the future based on any new information developed.

Ron Thomas

Ron Thomas
Wildlife Biologist

RT:lp

cc: J. Davis

1989 Deer Herd Management Plan Update

County: Mono

A. Description of the Deer Herd Management Unit

1. Herd Condition - Fair

a. Animal Condition - No current herd data is available. At present, individuals in the field appear to be in only fair condition, likely due to drought stress. This impression is substantiated by examination of bucks killed by hunters and by necropsy of a small number (~5/yr) of road killed animals and telemetered animals found dead.

References: Field surveys, necropsies of road kills, telemetered animals.

b. Herd health - Due to the facts of low recent fawn recruitment and little doe hunting, it is believed that doe age structure in the herd is skewed toward older animals. No hard data is available, except few necropsies of road kills, and telemetered animals.

References: Annual Composition counts, necropsies of road kills.

2. Population size - No population estimates prior to 1980 are available for this herd unit. Available estimates are as follows:

1980 - 3,703 Selleck-Hart (NDOW)
1981 - 4,500 " " "
1982 - 2,545 " " "
1983 - 1,470 " " "
1984 - 3,042 " " "
1985 - 3,985 " " "
1986 - 3,328 " " "
1987 - 4,071 " " "
1988 - 5,673 Selleck-Hart (CDFG)

3. Herd Statistics

	Harvest*			Fall		Spring
Year	NV Bucks	CA	Antlerless	Bucks	Fawns	Fawns
1985-6	44	314	-	15	44	26
1986-7	29	399	22	11	48	35
1987-8	61	164	31	22	37	21
1988-9	31	208	21	9	20	17

4. Deer Hunting

   a. Past and Current hunting strategies' effects on:

      1. Deer numbers - Due to the small percentage of the population taken through bucks-only hunting, regulated by quota sales, it is extremely unlikely that recent past and current hunting strategies have affected overall deer numbers in the herd. The low Nevada doe take is also unlikely to affect total population level.

      2. Herd composition - In 1981, the combined effects of hunting during the migration period and unlimited tag sales resulted in a high harvest, reducing buck ratios from 30 to 6 per 100 does. The current season dates and quota tag system are designed to increase these ratios by limiting harvest. Recovery has been difficult and sporadic due to drought conditions and poor fawn recruitment.

      3. Herd health - Studies and collection data suggest that the recent low buck ratios do not have a significant effect on breeding or overall herd health. No other possible 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 (in California) cannot be expected to affect total deer numbers.

      2. Herd composition - Proposed seasons and quota levels are designed to increase buck ratios through carefully regulated harvest. Increased precipitation, improved forage, and increased fawn survival are essential to effect this increase, however.

      3. Herd health - Continued bucks-only hunting (in CA) will not affect overall herd health, since harvest and buck ratios are regulated by flexible quota tag sales.

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

6. Other - Road Kill
   An estimated 75-120 deer are killed each year on Highway 395. The effect on total population is unknown. Research and negotiations with Caltrans are currently underway to attempt to reduce highway kill.

B. Non-human effects on deer

1. Weather

a. Drought - The current drought is creating a pronounced impact on the herd's range and forage and is the primary facto in the current decline in total deer numbers. The drought's effect on forage and deer is seriously amplified by the additive effects of poor grazing practices in all seasonal deer ranges. A small number (but substantial percentages) of necropsied deer have been found to be near starvation, as indicated by bone marrow condition.

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

c. Severe winters - During the 1987-88 and 1988-89 winters, temperatures as low as -30° F created stressful conditions on winter ranges, persisting for several weeks each year. The extreme cold and 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.

2. Predators - During telemetry studies of other eastern Sierra deer herds, mountain lions have taken up to 20% of marked adult deer during a single year. This may or may not be generally representative but suggests a high level of predation which may be a significant factor affecting total deer numbers. Coyotes are very numerous and undoubtedly take large numbers of deer, especially fawns.

3. Disease and Parasitism - Adequate seriology testing and necropsy effort has not revealed significant disease or parasite problems in the herd. It is known that the herd suffers from very low selenium levels, which has been demonstrated to affect animal vitality.

C. Effects of Current Deer Hunting 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 vegetation, and the short duration of the hunting season, it is not logical to expect any significant effects to any species of special concern.

b. Changes in regional and statewide 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 logical to expect any significant effects to any species of special concern.

2. Effects Upon 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 logical 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 hundred 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 East Walker 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 effect on housing are known or anticipated.

b. Transportation - No effects on transportation are known or anticipated.

c. Public Services - No effects on public services are known or anticipated.

d. Energy - No effects on energy are known or anticipated.

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

f. Aesthetics - To the extent that nonhunting or antihunting members of the public may be offended by the concept and activity of hunting, and if these persons are in Mono County during the three week hunting season, their aesthetic sense may be affected to some unknown degree. The mere presence of hunters in the field could represent a minor impact to aesthetics of others.

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

D. Range Landownership - Landownerhip of this herd's range has not changed since the herd plan was written.

E. Range Vegetation

1. Fire - There have been no substantial fires on this herd's range since the herd plan was written.

2. Grazing - The effects of continued poor grazing practices, coupled with serious drought impacts, continue to degrade all seasonal deer habitats. Application of the new Toiyabe National Forest Land Management Plan is hoped to alleviate some impacts over the long term (next 5-20 yrs). New BLM planning direction may provide benefits also.

THE EAST WALKER 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	15	44	26	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

B. Buck kill

Year	1985	1986	1987	1988	1989
	314	399	164	208	165

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 91 animals were captured and eartagged; 31 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 Mono Lake 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 suepected decline in total deer numbers. This trend is further evidenced by recent fawn ratios which are lower than any recorded since data collection began in 1960.

EAST WALKER/MONO LAKE* DEER HERD PLAN UPDATE

1992/93

Based on recently completed telemetry research demonstrating that these populations are mixed on the California summer range, future data on these two herds will be combined as a single herd unit.

I. Update of biological data

A. Composition counts

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	20	266	542

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	--	--	24(/100 adults)	-	510

* These spring fawn ratios were artificially inflated due to early counts conducted before substantial spring storms.

B. Buck kill (Calif. kill only)

Year:	1985	1986	1987	1988	1989	1990	1991	1992
E.W. Herd	314	399	164	208	165			
M.L. Herd	359	300	135	67	107			
EW/ML Herd						244	177	260

C. Telemetry study

In 1991, the three-year telemetry study of this herd unit was completed. The final report is available upon request.

D. Collection and necropsy

During March of 1990, sampling of female animals was performed. The report of that effort is available on request.

II. Update of habitat improvement projects

None

III. Other changes/additions to the herd plan

The severe winter of 1992/93 caused stress and high fawn losses in the herd. It is likely that adults animals also were affected and a reduction in total population is indicated. Accordingly, buck hunt tag quotas for the 1993 season will be reduced by 50%. Unlimited numbers of archers are hunting this population and the archery pressure is increasing rapidly, especially with reduced rifle quotas. This biologist believes that it may not be possible to effect herd buck ratio increases while heavy and uncontrolled archery hunting continues.

WEST WALKER DEER HERD PLAN UPDATE

1992/93

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	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	643	1229
1992-93	10	33	20	657	1598

B. Buck Kill (Calif. kill only)

Year:	1985	1986	1987	1988	1989	1990	1991	1992
	422	499	254	237	177	209	175	250

C. Telemetry study

As previously recommended in the Herd Management Plan, 111 animals from the W. Walker herd were captured during March, 1992 and marked for identification and for key habitat delineation; 44 of these were fitted with radio transmitter collars. Hill Bill funding is being used to employ a contract researcher for this effort which will include food habits, nutrition, measurements of reproductive performance, habitat quality analysis, and management recommendations. The study is now in its second year and interim reports are on file and available.

II.

U.C. Davis followup of the selinium application on the Little Antelope WMA has revealed uptake of the element by plants and by deer, as indicated by blood tests of a few live captured animals. Large sample composition counts of this population, compared with an adjacent population not treated, has revealed no statistically significant effects in terms of increased fawn ratios, however. The experiment did demonstrate that selinium can be administered to free-ranging deer where deficiencies are found, as is the case on many Great Basin ranges.

III. Other changes/additions to the herd plan

The severe winter of 1992/93 caused stress and high fawn losses in the herd. It is likely that adults animals also were affected and a reduction in total population is indicated. Accordingly, buck hunt tag quotas for the 1993 season will be reduced by 50%. Unlimited numbers of archers are hunting this population and the archery pressure is increasing rapidly, especially with reduced rifle quotas. This biologist believes that it may not be possible to affect herd buck ratios while heavy and uncontrolled archery hunting continues.

EAST WALKER/MONO LAKE* DEER HERD PLAN UPDATE

1993/94

Based on recently completed telemetry research demonstrating that these populations are mixed on the California summer range, future data on these two herds will be combined as a single herd unit.

I. Update of biological data

A. Composition counts

East Walker Herd Composition

year	Post-season bucks/100dd	Post season fawns/100dd	Spring fawns	Fall sample	Spring sample
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
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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	--	--	24 (/100 adults)	-	510

East Walker/Mono Lake Herd Composition

1993-94	21	28	26	506	297

B. Buck kill (Calif. kill only)

Year:	1985	1986	1987	1988	1989	1990	1991	1992
E.W. Herd	314	399	164	208	165			
M.L. Herd	359	300	135	67	107			
EW/ML Herd						244	177	260

1993

217 (This figure is a very preliminary X-12 zone-wide figure based on tags reportedly returned to Sacramento by Feb. 30. No tags have been recieved in the unit office, precluding comparable data.)

C. Telemetry study

In 1991, the three-year telemetry study of this herd unit was completed. The final report is available upon request.

D. Collection and necropsy

During March of 1990, sampling of female animals was performed. The report of that effort is available on request.

II. Update of habitat improvement projects

None

III. Other changes/additions to the herd plan

The severe winter of 1992/93 caused stress and high fawn losses in the herd. It is likely that adult animals also were affected and a reduction in total population is indicated. Accordingly, buck hunt tag quotas for the 1993 season will be reduced by 50%. Tag quotas for the 1994 season will provide a small increase in rifle hunting opportunity based on surveyed increase in buck ratio this past winter.

The effects of unlimited numbers of archers hunting this population has been addressed this year through implementation of an archery quota of 500 tags in Zone X-12 to control intense hunting pressure which has been increasing rapidly, especially with reduced rifle quotas. It is hoped that it may now be possible to effect herd buck ratio increases through positive control of total buck harvest.

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	21	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.

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.

THE EAST WALKER AND MONO LAKE DEER HERDS:

REPRODUCTION AND CONDITION-MARCH 1990

Prepared for:

California Department of Fish and Game
407 West Line Street
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Prepared by:

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INTRODUCTION

Within the last five years, the East Walker and Mono Lake deer herds have been of management concern because of poor fawn survival and low recruitment. Fall fawn:doe ratios have averaged 35 fawns:100 does; spring ratios have averaged 16 fawns:100 does (Ron Thomas, Calif. Dept. Fish and Game, pers. comm.).

The first priority of management in any deer herd where fawn production is suboptimal should be to consider the nutritional status of does at breeding and during pregnancy (Connolly 1981). Numerous studies have documented the importance of maternal nutrition to reproduction (Verme 1965, Robinette et al. 1973, Ozaga and Verme 1982). These studies have consistently shown that does on good range have higher rates of ovulation, conception and pregnancy than does on poor range.

Accurate assessment of body condition of individual deer is fundamental to establishing and understanding relationships between deer populations and their habitat. Based on this understanding, management activities can be better designed and more successful in attaining management goals. Fat is the body component most often associated with animal condition and various indices have been developed to estimate fat reserves. The most commonly used body composition indices include bone marrow fat concentration and kidney fat index (KFI) which have been shown to be useful

measures of nutritional state in mule deer.

In this investigation, part of a larger study of mule deer (Odocoileus hemionus hemionus) in the eastern Sierra, body composition indices and reproductive tracts were used to determine the physical condition and reproductive potential of adult does collected from the East Walker (EW) and Mono Lake (ML) herd winter ranges in southwestern Lyon and Mineral Counties, Nevada.

STUDY AREA

The EW deer herd occupies approximately 2,000 km in Mono and Tuolumne Counties, California and Mineral and Lyon Counties, Nevada. The herd winter range is located some 30 km north of Bridgeport, California, and encompasses approximately 140 km^2 on the Toiyabe National Forest (TNF) in Mineral and Lyon Counties, Nevada (Figure 1). Prominent geological features on the winter range include the Pine Grove Hills and the East Walker River, which flows north into Nevada from the Eastern Sierra and the Bridgeport Valley of California.

Winter range vegetation is Great Basin Sagebrush Scrub type, consisting primarily of big sagebrush (Artemisia tridentata), bitterbrush (Purshia tridentata), and rabbitbrush (Chrysothamnus spp.). Singleleaf pinyon pine (Pinus monophylla)-western juniper (Juniperus occidentalis) woodland dominates vegetation between 1,950-2,450 m. The most common grass species occurring on the winter range

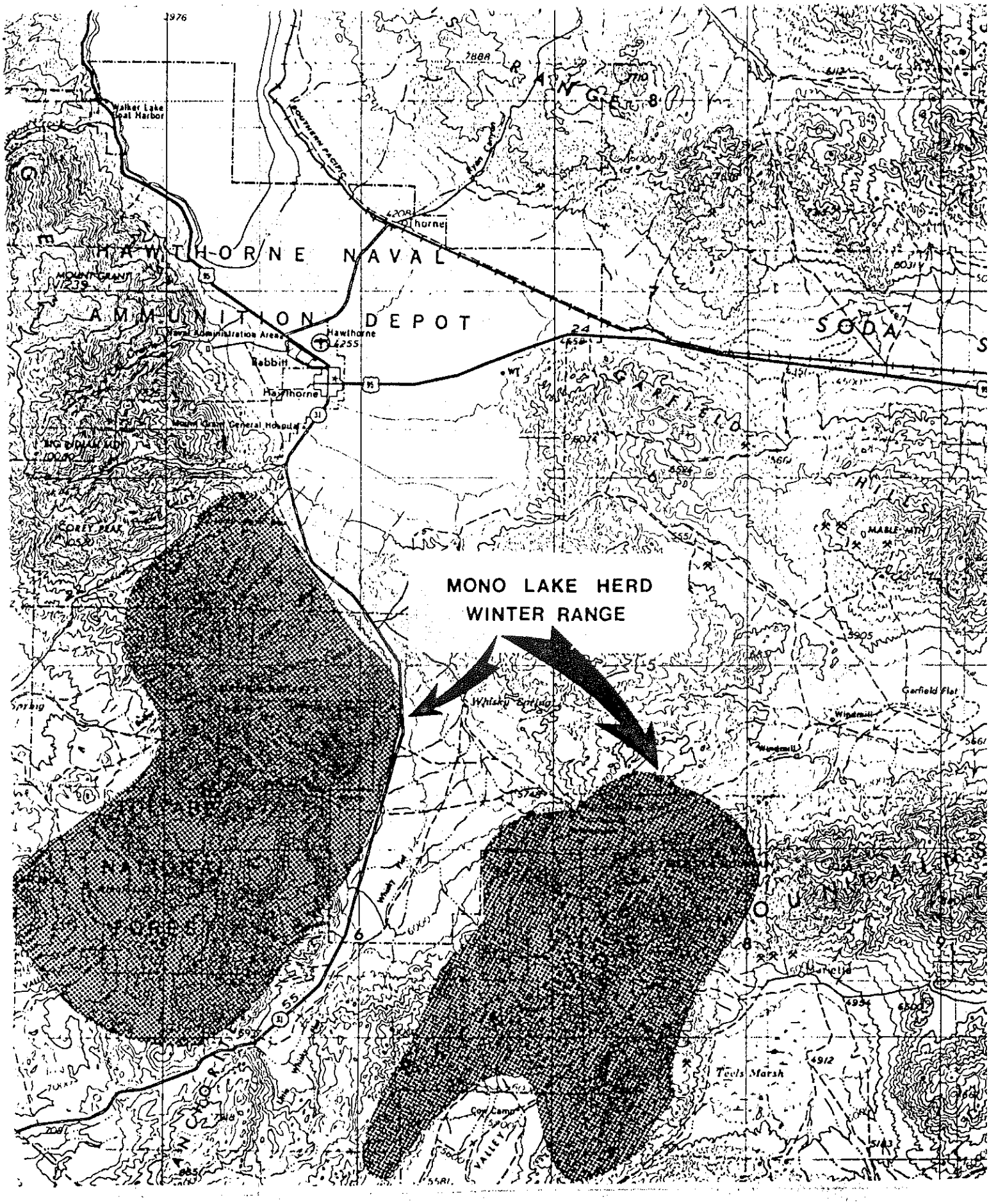

Figure 1. Location of the East Walker deer herd winter range in Lyon County, Nevada.

include needlegrass (Stipa spp.), bluegrass (Poa spp.), cheatgrass (Bromus tectorum), and Indian ricegrass (Oryzopsis hymenoides). Common forbs include: yarrow (Achellea spp.) and lupine (Lupinus spp.). Terrain is steep and rugged with highly erodible soils that are shallow to moderately deep (25-100 cm) and generally have a sandy loam texture (Thomas 1985a).

The ML deer herd occupies approximately 2,000 km^2 of summer, winter and transition ranges in Mono and Tuolumne Counties, California and Mineral County, Nevada (Figure 2). The herd winter range, which encompasses some 250 km^2, is located in Mineral County, Nevada on the TNF, between 10 and 35 km south of Hawthorne, Nevada in the Excelsior and Wassuk Mountain ranges. Winter range vegetation is Great Basin Sagebrush Scrub type, consisting of sagebrush, bitterbrush and rabbitbrush. Pinyon-juniper woodland dominates vegetation above approximately 2,070 m. Terrain is moderately sloping with soils consisting of an admixture of sandy loams which shallow and rocky (Thomas 1985b).

Deer from the EW and ML herds share approximately 2,000 km^2 of summer range on the TNF, primarily along the east slope of the Sierra Nevada. Portions of the Stanislaw National Forest (SNF) in Tuolumne County on the west side of the Sierra Nevada are also used to a limited extent by summering deer.

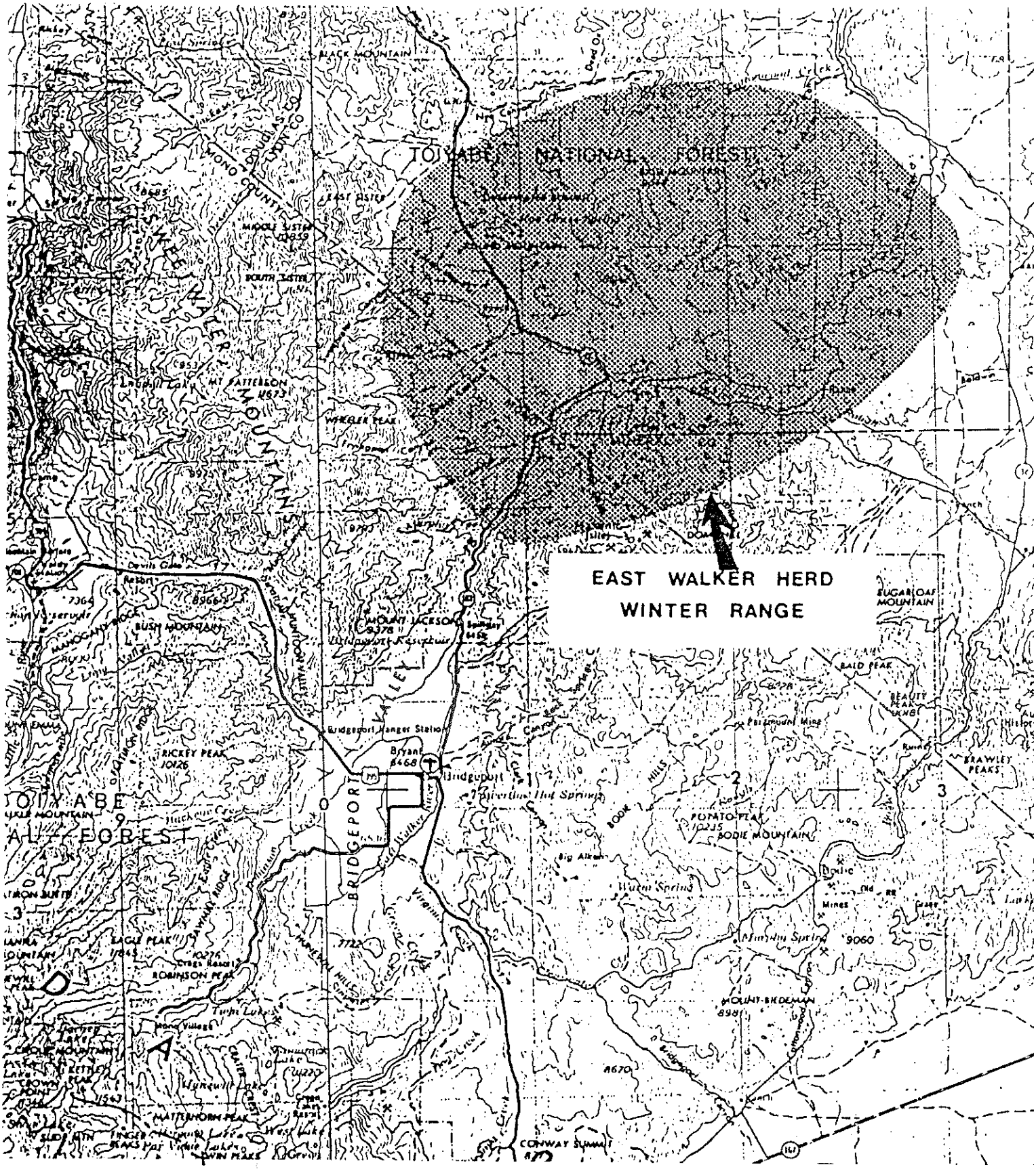

Figure 2. Location of the Mono Lake deer herd winter range in Mineral County, Nevada.

METHODS

From 21-23 March 1990, deer from the East Walker and Mono Lake herd winter ranges were collected by California Department of Fish and Game (DFG) and Nevada Department of Wildlife (NDW) personnel. Deer were collected by several teams which consisted of a shooter and a spotter. All collection teams were instructed to shoot the first identifiable adult doe, regardless of the animals apparent age and condition. Binoculars and spotting scopes were used by the spotter to distinguish adult does from fawns and antlerless bucks. Once an adult doe was identified, it was shot in the head or anterior portion of the body cavity with a high powered rifle.

All animals were brought to a field processing station where they were weighed to the nearest pound using a spring scale ("bled carcass weight" BCW; Anderson et al. 1972) and measured. External carcass measurements of adult animals included chest girth, contour length, tail length and left hindfoot. Reproductive tracts (uterus and ovaries) were extracted and eventually frozen for later analysis in the laboratory. The ages of all animals collected were estimated by tooth wear and replacement (Larson and Taber 1980). Age is the number of years to the nearest birthday in June or July, e.g., age 3 years refers to animals that are approximately 2.7 years old. To provide suitable sample sizes, age classes were formed by pooling 2 consecutive year cohorts (e.g., 2-3 yr).

Once reproductive tracts were thawed the ovaries were sectioned and examined macroscopically for the presence of corpora lutea of pregnancy (CLP) which were used to estimate ovulation rates (Cheatum 1949). Fertilization rates were determined by the ratio of viable embryos to CLP. All fetuses were counted, sexed and weighed to the nearest half ounce, and measured. I measured forehead-rump distances of fetuses to estimate fetal age, and thus conception and fawning dates. The forehead-rump measurement, fawning, and conception dates were obtained using a fetus scale (Forestry Suppliers Inc., Jackson, Mississippi). I used the midpoint in ranges of fetal age based on length to assign ages to individual litters.

Right kidneys only were used to determine kidney fat index (KFI: Riney 1955). The kidney-fat index was calculated by dividing the fresh weight of the kidney fat by the fresh weight of the fat free kidney from each deer and multiplying by 100. Left femur marrow fat was analyzed for percent fat content. An index (CONINDEX) based on femur marrow fat concentration and right trimmed KFI was calculated following Connolly (1981:334)

I used a Mann-Whitney U Test and parametric t-test to examine differences in reproductive and condition parameters between herds. A 1-way analysis of variance was used to examine differences in age classes for each of the condition indices: KFI, FMF and BCW.

RESULTS

On 21 and 23 March, 17 does (3 yearlings and 14 adults) were collected from the EW winter range. One of these does, a yearling, was a vehicle killed animal collected on 21 March from Route 182 near the north end of Bridgeport Lake. On 22 March, a total of 19 does (2 yearlings and 17 adults) were collected from the ML deer herd winter range. Four of these deer were taken from the Rattlesnake Flat area located at the base of the north slope of the Excelsior Mountains; 15 deer were collected from the base of the east slope of the Wassuk Range, between Anchorite Pass and Cottonwood Canyon. On 7 April 1990, an adult doe killed by a vehicle on Route 395 near its junction with Route 270, the road to Bodie State Park, was also included in the collection sample.

Appendix Table 1 presents summary data, stratified by herd and by age (adult or yearling), for does collected in March of 1990. Although not statistically significant, the ages of adult does averaged slightly older for the ML herd. The age structure of adult does stratified by herd is presented in Appendix Figure 1.

REPRODUCTION

Reproductive Potential

Pregnancy rates among 32 adult does examined (32 reproductive tracts) form both herds was 100%. Pregnancy rates among 3 yearling EW does was 33%; pregnancy rates among 2 Mono Lake yearlings was 50%. Adult fetal rates, 1.93

fetuses/adult doe and 1.88 fetuses/adult doe for the EW and ML herds, respectively, were not significantly different among herds. Appendix Tables 2a and 2b present age specific data by year class for the EW and ML herds. For adult does from the EW herd, 28 CLP resulted in 28 viable, implanted fetuses. For ML does, 39 CLP resulted in 35 fetuses for an overall fertilization rate of 89.7%. Two does, one from each herd, were pregnant with triplets.

Fetal Sex Ratios

The combined fetal sex ratio of EW does was 50% males versus 37% males in ML does (Appendix Table 3). Examination of pooled data (EW and ML) for individual age classes revealed 7, 7, and 4 male and 9, 7, and 4 female fetuses for the 2, 3 and 4 year classes, respectively; for the 5, 6 and 7+ year classes, there were 4, 0 and 4 male and 2, 4 and 10 female fetuses, respectively.

Breeding and Fawning Seasons

There was no significant difference in mean fetal size between herds. Back-dated ages of fetuses from 32 females collected from both herds between 21-23 March suggest that breeding occurred between 23 November and 28 December with a median date of 2 December. Of the 32, 11 (34%) bred between 1 and 5 December; 5 (16%) between 21 and 25 December; and 4 (12.5%) between 25 and 30 November, 11 and 15 November and 16 and 20 November. Assuming a period of gestation of about

204 days (Anderson 1981), parturition occurred from mid-June to mid-July with a median date of about 23 June.

CONDITION

I found no differences in condition indices between herds (Appendix Table 1). Although not statistically significant, fat indices averaged slightly higher in Mono Lake does than the alternative. There was no difference in KFI among ML age classes ($F=1.12$, $P=0.05$); no differences in KFI were detected among EW age classes ($F=3.98$, $P=0.05$). The KFI of 2 year old ML does was significantly greater ($P>0.05$) than that of 2 year olds EW does. For all deer ($N = 38$), highest mean KFI's occurred among 3 year old does (35%), followed by 2 year olds (34%) and 4-5 year olds (28%). Yearling and older does $\geq$ 6 years exhibited the lowest mean KFI's, 24% and 26%, respectively.

There was no difference among herds in percent FMF ($P\geq0.05$). Percent FMF for EW does ranged from 15.6%-88.9%; percent FMF for ML does ranged from 13.6%-53.5%. No differences were detected in FMF among ML age classes ($F=2.5$, $P=0.05$) and EW age classes ($F=1.4$, $P=0.05$). Highest mean FMF in EW and ML does was among 2 year olds (85%), followed by 4-5 year olds (79.5%), and yearlings (76.5%). Six year and older does had a combined FMF of 53%.

I found no difference between herds ($P>0.05$) in mean CONINDEX ratings. Highest mean CONINDEX ratings occurred among 4-5 year olds (108), followed by 2 year olds (98) and 3

year olds (96). Older does and yearlings showed the lowest mean ratings of 64 and 75, respectively. There was no difference in average BCW between herds ($P>0.05$).

DISCUSSION

Reproductive potential was comparable between the EW and ML herds. Adult fetal rates for both herds, were slightly higher than the majority of those reported by Anderson (1981, pp. 44-47) for other mule deer populations throughout the west. A similar investigation conducted in 1987 and 1988 of another eastern Sierra deer herd, the Casa Diablo herd, reported a mean fetal rate of 1.83 fetuses/doe and a 100% pregnancy rate among 35 females collected from winter range near Benton, California (Taylor, Unpubl. data). Kucera (1988) reported a fetal rate of 1.88 fetuses/doe and 100% pregnancy rate for does collected in 1984 from the Round Valley winter range near Bishop, California.

Comparatively high reproductive rates for both yearling and older females in this study suggested minimal nutrition deficiencies with little influence on potential productivity. Pronounced effects of reduced nutritional plane on reproduction have been documented for free-ranging and confined populations of mule and white-tailed deer (Cheatum and Severinghaus 1950, Robinette 1955, Teer et al. 1965, Kie et al. 1980). Julander et al. (1961) reported rates of 1.9 and 1.2 fetuses per doe in two mule deer populations residing

on summer range of high and low carrying capacity, respectively, following poor nutrition and hard winters. The productivity of whitetail does fed a good ration was nearly twice that of those on a restricted diet (Verme 1967). Kucera (1988) associated declining reproductive rates, body weights and fetal sizes in deer from the Buttermilk herd with decreasing precipitation and forage.

According to Riney (1955) and Kie et al. (1984), KFI is a valuable indicator of nutrition between two populations. Although not statistically significant, mean KFI's, FMF and CONINDEX scores for deer in ML herd were comparatively greater than in deer from EW herd. Mean KFI's for the ML herd were 34% versus 25% for the EW herd. KFI's for the Casa Diablo herd averaged 39% (Taylor, Unpubl. data), and Kucera (1988) reported mean KFI's as high as 70% and as low as 10% in deer collected near Bishop, California.

There were large variations in fat indices within and between individual EW and ML age classes. KFI's ranged from 13.6-55.9% and 13.6-74.3% for the EW and ML herds, respectively. Does with KFI's below approximately 15% indicate essentially no kidney fat, and is the level at which a deer begins to use femur marror fat (Harris 1945, Riney 1955). Once deer begin mobilization of femur marror fat, KFI may not be a good indicator of condition (Connolly 1981). Therefore, a more subjective method (CONINDEX) which combines KFI and FMF measures was used to rate the physical condition of deer.

Differences in condition among individuals of the same cohort suggests that these animals occupied summer ranges with varying degrees of habitat quality. Deer with comparatively low fat measurements may be from summer ranges of poorer quality than deer with higher levels of body fat. If deer cannot obtain adequate amounts of quality foods on the summer and intermediate ranges in early autumn, production of body fat will be diminished (Short 1981). Does with lower fat levels may also have been animals that reared fawns the preceding summer, devoting much of their stored energy to lactation demands.

Although not statistically different, yearling and older does ($\leq$ 6 years) exhibited the lowest mean KFI's and CONINDEX scores. Therefore, the relatively low KFI's obtained for this study may partially be due to the large percentage of young deer and older adults in the sample. Connolly (1981) suggested that lower productivity in young and old does may be an indication that they are less healthy, on the average, than does of prime age. However, pregnancy rates and fetal rates among does 6 years and older in this study were 100% and 2.00 fetuses/doe, respectively, indicating a high reproductive potential and an adequate nutritional plane among older age classes. Additionally, the fact that nearly half the yearlings collected were pregnant would suggest a higher level of nutrition than would normally be expected among individuals of this age class.

Adequate maternal nutrition among all age classes is also indicated by the fact that there were no observed differences in fetal sizes, and estimated fetal ages or conception dates. According to Verme (1965) and Mansell (1974), maternal nutrition can influence the onset of estrous. Verme (1967) found that yearling whitetail does will not conceive fawns if summer and fall nutrition is inadequate. Short (1981) reported that marginal range conditions, owing to overgrazing or seasonal drought, can adversely affect the nutrition of does and the reproductive success of mule deer. In other words, if nutrition is suitable only for maintenance, then productive functions suffer.

For the ML herd, fetal sex ratios strongly favored females (59 M:100 F), another indication of adequate maternal nutrition as previously indicated by fetal rates and fetal sizes. Robinette et al. (1957), found that males comprised 42 percent of the fetuses produced by mule deer living on comparatively good range. In contrast, males comprised 65% of fetuses carried by does on poor range. On Michigan's George Reserve, McCullough (1979) found that male fetuses were conceived in years with higher population densities created by a suboptimal nutritional plane. According to Verme (1969), adult white-tailed does which fed on a poor diet prior to breeding produced 72% males, while does that fed on good diets produced 43% males.

In Utah, the fetal rates of yearlings on poor range was

greater after a mild winter than after a severe one (Robinette et al. 1955). This mostly applied to yearlings that occupied good versus poor summer range.

The high reproductive rates and increased condition among yearlings and adult does in this study may also be partially due to a mild winter. This collection took place after a fourth successive winter of drought, when lack of snowfall at higher elevations allowed deer to remain on summer and transition ranges until late January. During mild winters, deer can reduce intraspecific competition for forage by exploiting food resources on both transition and winter ranges that are normally not available because of deep snow. At least four radio-collared deer from the present study remained on transition ranges to the west of Bridgeport until early February. One radioed doe from the East Walker herd remained on her summer range in the Bodie Hills until late February, after which she migrated to a lower elevation spring range offering an abundance of succulent forage.

Because of the comparatively high reproductive potential of the East Walker and Mono Lake populations, it is logical to assume that poor fawn recruitment is largely a function of neonatal losses and to a lesser extent, prenatal mortality in the third trimester of pregnancy. Neonatal losses are in turn responsible for higher reproductive rates since does are relived of the strain of lactation enabling them to meet their metabolic requirements during the summer and autumn.

They enter the autumn breeding season in good condition and are able to conceive and maintain a higher level of maternal nutrition during the winter months. This results in lower prenatal mortality and a higher reproductive potential. Ransom (1967) found that winter stressed whitetails in Manitoba exhibited a high gross productivity that was probably related to increased fecundity of nonlactating does that suffered natal fawn losses.

MANAGEMENT IMPLICATIONS

Present indications suggest that high neonatal losses may be the major cause of poor fawn recruitment in the East Walker and Mono Lake populations. Future management work should focus on determining the magnitude of neonatal mortality within these populations and the extent to which these losses are nutritionally related. This could be achieved through a spring collection or examination of vehicle killed does in order to assess reproductive performance during the third trimester of pregnancy. Verme (1962) identified a close relationship between neonatal mortality and maternal nutrition during the third trimester of pregnancy. Weege (1975) found that 40% of red deer calves died soon after being dropped because the hinds were undernourished during pregnancy.

The quality of summer habitats should also be closely evaluated in order to determine the impacts of livestock grazing and other land use factors on fawn hiding cover.

Smith and Lecount (1979) reported that survival of fawns was influenced by vegetation because increased cover reduced predation. Additionally, it may be prudent for deer managers to assess the quality of spring holding areas in order to determine if these areas are sufficient to maintain the nutritional requirements of does in their third trimester of pregnancy. Bertram and Remple (1977) found some holding areas used by deer from the North Kings herd were generally deficient in forage and cover. Deer apparently left the winter range after the spring green-up period in good condition, but fell off to poor condition during the spring migration. It was postulated that this loss of condition in does in their third trimester of pregnancy contributed to the birth of weak fawns, of which there was a high loss on the summer range within 30 days after birth.

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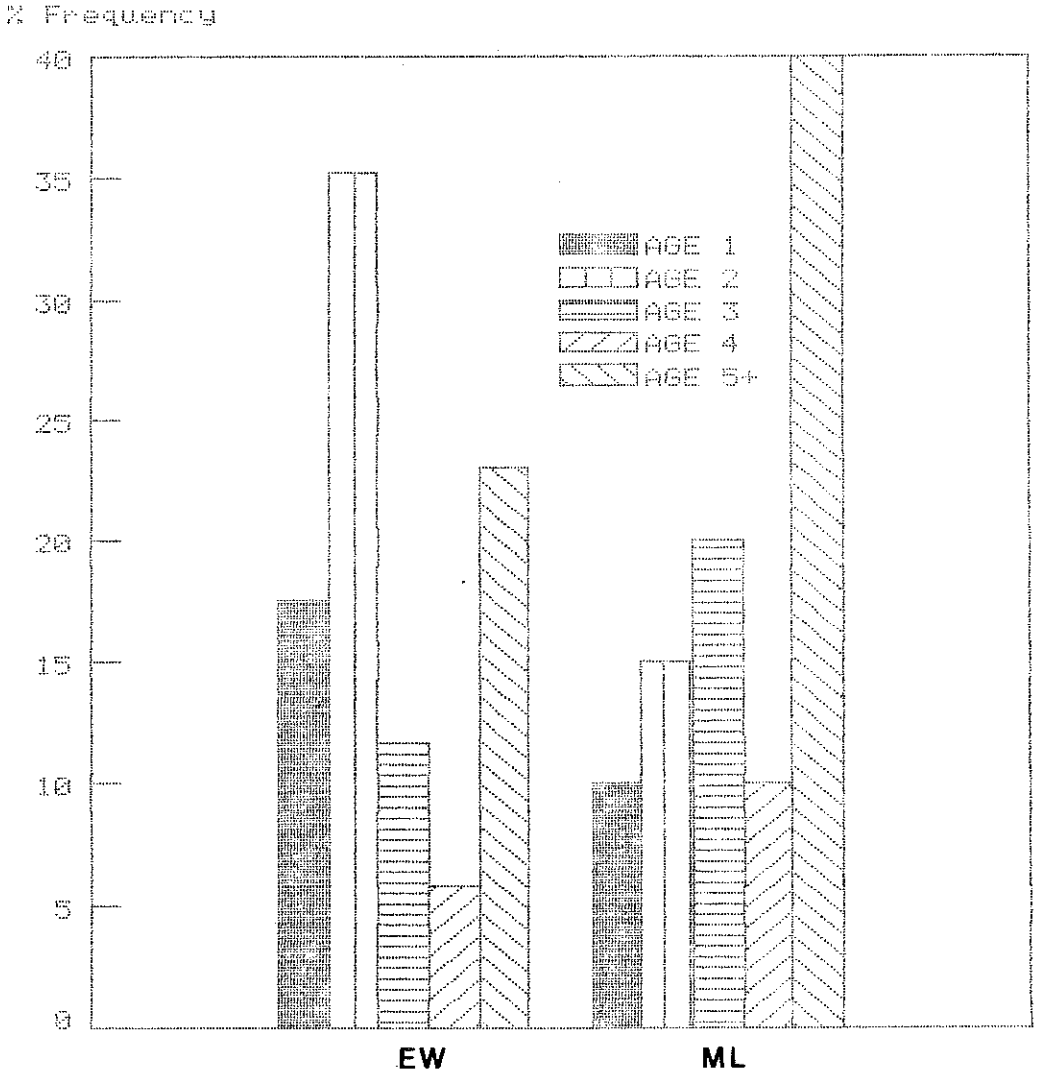
FIGURE 1. AGE STRUCTURE OF DOES

EAST WALKER MONO LAKE DEER HERDS



Appendix Table 1. Summary table of reproduction and body characteristics of 32 adult female mule deer collected on the East Walker and Mono Lake herd winter ranges, Mineral and Lyon Counties, Nevada. March 1990.

					ADULTS										
					FETAL RATE		FETAL AGE (DAYS)			FETAL CR LENGTH (mm)			AVE	AVE	AVE
HERD	AVE. AGE	BCW (lbs)	% PREG.	C.L. RATE	#/ DOE	#/ PREG.	AVE	MIN	MAX	AVE	MIN	MAX	% KFI	% FMF	CONINDEX SCORE
EW	3.5	104.0	100	1.00	1.93	1.96	108	95	115	237	170	250	25.0	67.9	77.5
ML	4.6	110.0	100	1.14	1.88	1.88	109	95	125	224	190	225	33.9	77.9	96.1

Appendix Table 2a. Frequency of occurrence of fetuses in East Walker does by age class.

YEAR CLASS	NUMBER OF FETUSES 0 %	0 No	1 %	1 No	2 %	2 No	3 %	3 No	TOTAL NUMBER OF FETUSES	TOTAL NUMBER OF DOES	% AND TOTAL NUMBER OF PREGNANT DOES %	No.	FETUSES PER DOE	FETUSES PER PREGNANT DOE
1	66	2	33	1	0	0	0	0	1	3	33	1	.33	1.00
2	0	0	33	2	66	4	0	0	10	6	100	6	1.60	1.60
3	0	0	0	0	66	2	33	1	7	3	100	3	2.33	2.33
4	0	0	0	0	100	1	0	0	2	1	100	1	2.00	2.00
5+	0	0	0	0	100	4	0	0	8	4	100	4	2.00	2.00
SUM	12	2	18	3	65	11	5	1	28	17	88	15	1.64	1.86

Appendix Table 2b. Frequency of occurrence of fetuses in Mono Lake does by age class

YEAR CLASS	NUMBER OF FETUSES 0 %	0 No	1 %	1 No	2 %	2 No	3 %	3 No	TOTAL NUMBER OF FETUSES	TOTAL NUMBER OF DOES	% AND TOTAL NUMBER OF PREGNANT DOES %	No.	FETUSES PER DOE	FETUSES PER PREGNANT DOE
1	50	1	50	1	0	0	0	0	1	2	50	1	.50	1.00
2	0	0	0	0	100	3	0	0	6	3	100	3	2.00	2.00
3	0	0	25	1	75	3	0	0	7	4	100	4	1.75	1.75
4	0	0	0	0	50	1	50	1	5	2	100	2	1.66	1.66
5+	0	0	22	2	78	7	0	0	16	9	100	9	1.77	1.77
SUM	5	1	20	4	70	14	5	1	35	20	95	19	1.75	1.84

Appendix Table 3. Sex of fetuses in 4 maternal age classes of mule deer from the East Walker and Mono Lake deer herds, Mineral and Lyon Counties, Nevada.

Maternal age class (yr)	Mono Lake			East Walker		
	No. M	No. F	% M	No. M	No. F	% M
1-2	6	5	55.4	3	4	42.9
3-4	6	3	66.0	4	8	33.3
5-6	1	3	25.0	3	3	50.0
$\leq$ 7	1	3	25.0	3	7	30.0

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. Paulsen
K. Brown
M. Walter
L. Sitton

Please distribute to wardens

JA 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.

State of California — The Resources Agency

M E M O R A N D U M

Date: 23 August 1990

To: David A. Jessup
Staff Wildlife Pathologist

From: **Department of Fish and Game**- Eastern Units Supervisor, R-5

Subject: Marrow Fat Findings, East Walker and Mono Lake Deer

Thank you for the copy of your recent letter to G. Tanner on subject item. You stated that it appears that East Walker animals are in significantly poorer condition than Mono Lake animals. I took the data a step further, and examined them using a (nonparametric) Mann-Whitney U Test, and a (parametric) t-test. Both tests yielded the same results; that is, no difference exists between mean marrow fat indices obtained from East Walker and Mono Lake deer ($P>0.05$ in both cases).

Vernon C. Bleich
Associate Wildlife Biologist

cc: R. Thomas
D. Updike
G. Tanner (NDOW)

Bleich

STATE OF CALIFORNIA—RESOURCES AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF FISH AND GAME
WILDLIFE INVESTIGATIONS LABORATORY
1 NIMBUS RD., SUITE D
RANCHO CORDOVA, CA 95670
(916) 355-0124

August 17, 1990

Mr. Greg Tanner
Nevada Department of Wildlife
P.O. Box 10678
Reno, NV 89520

Dear Mr. ~~Tanner~~ Greg:

Enclosed please find data sheets for bone marrow from the deer we collected this last winter. Ron Thomas has the individual animal data sheets with all the weights and measures. I must leave it to him or Tim to incorporate this data into the total.

The fat percentage is probably the most sensitive and useful single condition indicator. Even without considering all the data, it appears that the East Walker deer were in significantly poorer condition than the Mono Lake animals.

Hope this is of some help.

Sincerely,

David A. Jessup, DVM MPVM

Enclosure

cc: Mr. Craig Mortimer,
Nevada Department of Wildlife
Mr. Ron Thomas, Mr. Vern Bleich,
Region V - Bishop
Mr. Doug Updike, Wildlife
Management Division

OMMAND: LIST MISSING VALUE TREATMENT: INCLUDE

CASE	VARIABLES: EW	ML
1	71.0600	84.7600
2	69.5600	75.1400
3	87.6700	64.2900
4	79.8300	79.0300
5	28.8500	79.0500
6	85.9700	87.2600
7	69.8400	92.4000
8	26.3200	82.8300
9	79.8300	63.7400
10	88.9900	67.3100
11	15.6100	87.2900
12	45.8100	89.3600
13	70.8700	84.7100
14	79.6400	19.7200
15	77.8700	87.6100
16	79.7600	74.3500
17	77.5800	91.5400
18	88.2700	79.6400
19	MISSING	77.8700
20	MISSING	79.7600
21	MISSING	77.5800
22	MISSING	88.2700

OMMAND: MANN MISSING VALUE TREATMENT: VARWISE

*** MANN-WHITNEY U TEST ***

ETWEEN ARIABLES:	SAMPLE SIZE	U	MEAN	STD DEV
	18	246.500	198.000	36.7831
	22	149.500		

-SCORE 1.31854 ONE-TAILED PROB = 0.0937

OMMAND: TIND MISSING VALUE TREATMENT: VARWISE

*** INDEPENDENT T TEST ***

		MEAN	STD DEVIATION	N
OR VARIABLES:	EW	67.9628	22.7966	18
AND	ML	77.8868	15.3300	22

STATISTIC = -1.64034
EGREES OF FREEDOM = 38
NE AILED PROB = 0.0546
WO-TAILED PROB = 0.1092

EAST WALKER/MONO LAKE DEER HERD PLAN UPDATE

1994/95

I. Update of biological data

A. Composition counts

East Walker Herd Composition

year	Post-season bucks/100dd	Post season fawns/100dd	Spring fawns	Fall sample	Spring sample
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	20	266	542

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	--	--	24(/100 adults)	-	510

East Walker/Mono Lake Herd Composition

1993-94	21	28	26	506	297
1994-95	21	30	29	296	1307

. Buck kill (Calif. kill only)

Year:	1985	1986	1987	1988	1989	1990	1991	1992
E.W. Herd	314	399	164	208	165			
M.L. Herd	359	300	135	67	107			
EW/ML Herd						244	177	260

1993	1994^
217	142

^ This figure represents the total X-12 Zone estimated take (including nonreported) which includes the West Walker herd.

C. Telemetry study

In 1991, the three-year telemetry study of this herd unit was completed. The final report is available upon request.

D. Collection and necropsy

During March of 1990, sampling of female animals was performed. The report of that effort is available on request.

II. Update of habitat improvement projects

None

III. Other changes/additions to the herd plan

The 1995 hunt quota in Zone X-12 will be 750 tags, unchanged from the 1994 level.

The effects of unlimited numbers of archers hunting this population was addressed last year through implementation of an archery quota of 500 tags in Zone X-12 to control intense hunting pressure which has been increasing rapidly, especially with reduced rifle quotas. This quota is unchanged for the 1995 season. It is hoped that it may now be possible to effect herd buck ratio increases through positive control of total buck harvest.

It is anticipated that the 1995 increase in fawn ratios may result in an increase in herd deer numbers. Currently, feed, water and cover conditions are excellent on all portions of the herd's range. Weather patterns and

precipitation patterns next winter will again be crucial to future herd performance.