THE BURRO DEER HERD MANAGEMENT PLAN

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BURRO DEER HERD MANAGEMENT PLAN

Approved

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I. INTRODUCTION

In the early 1960's, deer numbers in California began a continuous, long-term decline (Longhurst et al., 1976). In 1976, after obtaining considerable public input, the California Department of Fish and Game responded by proposing a new program for deer management on a herd basis. The following year, increased authority was added to the program through legislative mandate (AB 1521) and a new statewide policy for deer management was adopted. Specifically, it required that: 1) planning for deer management be on a herd basis: 2) selected program elements be included in each herd plan; and 3) herd plan goals conform to the goals of the statewide plan.

This document is intended to conform to the legislative mandate and Department policy commitment as a management plan for the burro mule deer in California. The plan includes: 1) description of the deer population and the physical environment which constitutes its range and habitat: 2) management goals; 3) management problems; 4) management programs, objectives and recommended prescriptions; 5) alternatives to proposed programs; 6) selected references; and 7) appendices containing supporting information.

In 1940, Longhurst and Chattin stated: "Of the six kinds of black-tailed deer in California (sic), the burro deer is probably the least known." Because of their widely scattered distribution and low density, information on burro deer ecology remained scarce until advancements in biotelemetry increased the feasibility for studying them.

In March 1980, a three-year telemetry study to acquire basic management information was initiated. Also within this period, the Bureau of Reclamation (BR) sponsored a one year study of deer utilization of the Colorado River riparian zone. Much of the herd and habitat data is derived from those studies. Additional input has been solicited from local Wildlife Protection personnel; the U.S. Bureau of Land Management (BLM), Riverside and Yuma Districts; Cibola National Wildlife Refuge; Imperial National Wildlife Refuge; Picacho State Recreation Area; Colorado River Indian Tribes; Desert Wildlife Unlimited; Palo Verde Rod and Gun Club; Imperial County Fish and Game Commission, and other interested publics.

II. DESCRIPTION OF THE DEER HERD MANAGEMENT UNIT

A. Deer Herd Definition and History

1. Herd Definition

In California, the burro deer inhabits the southeastern corner of the state, (Fig. 1). Their range extends from the Colorado River, on the east, to State Highway 111 and Interstate Highway 10 in the Imperial and Coachella Valleys. From the Mexican border on the south, it extends northward to State Highway 62 and to Needles, east of Highway 95. (See Figure 2 for map of the herd boundary).

The herd management boundary generally corresponds to the burro deer range described by Longhurst and Dasmann (1952) and presently delineates hunt zone D-12. This area comprises 7,026 square miles and includes portions of San Bernardino, Riverside and Imperial Counties.

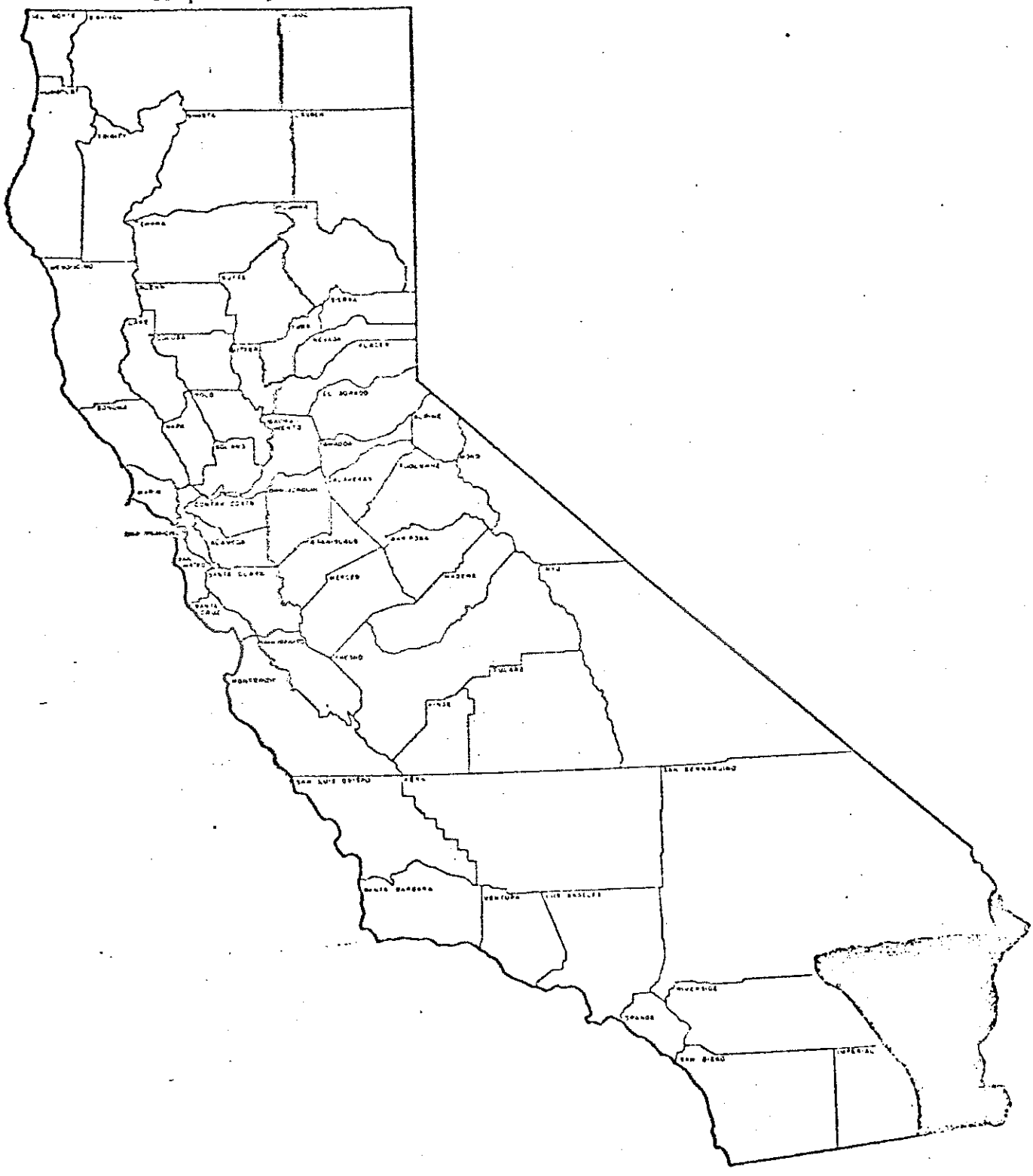
Practical management needs require the large management unit to be divided into eight sub-units (Figure 2).

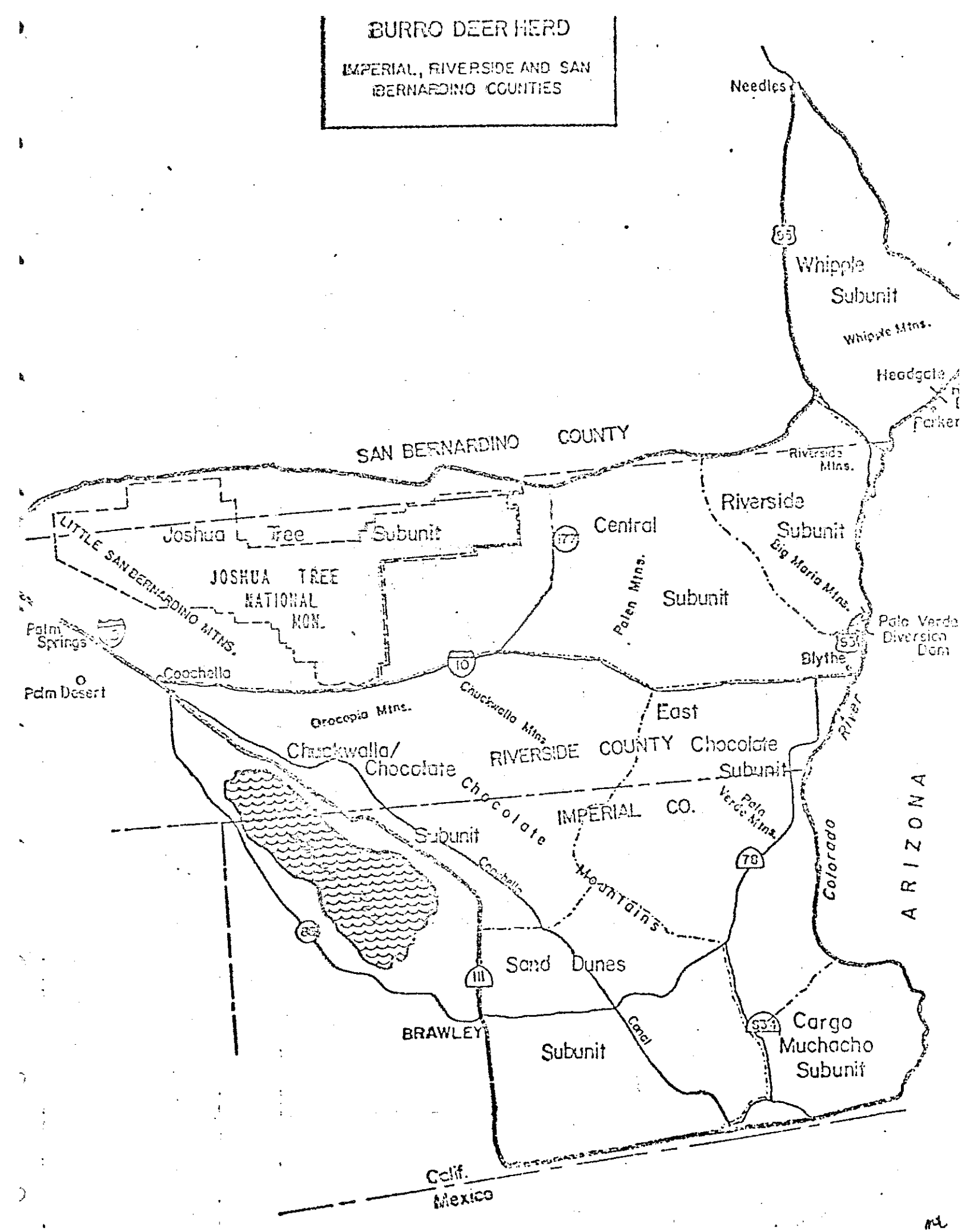
FIGURE 1.

Vicinity Map

Burro Deer Herd Unit

Imperial, Riverside, and San Bernardino Counties

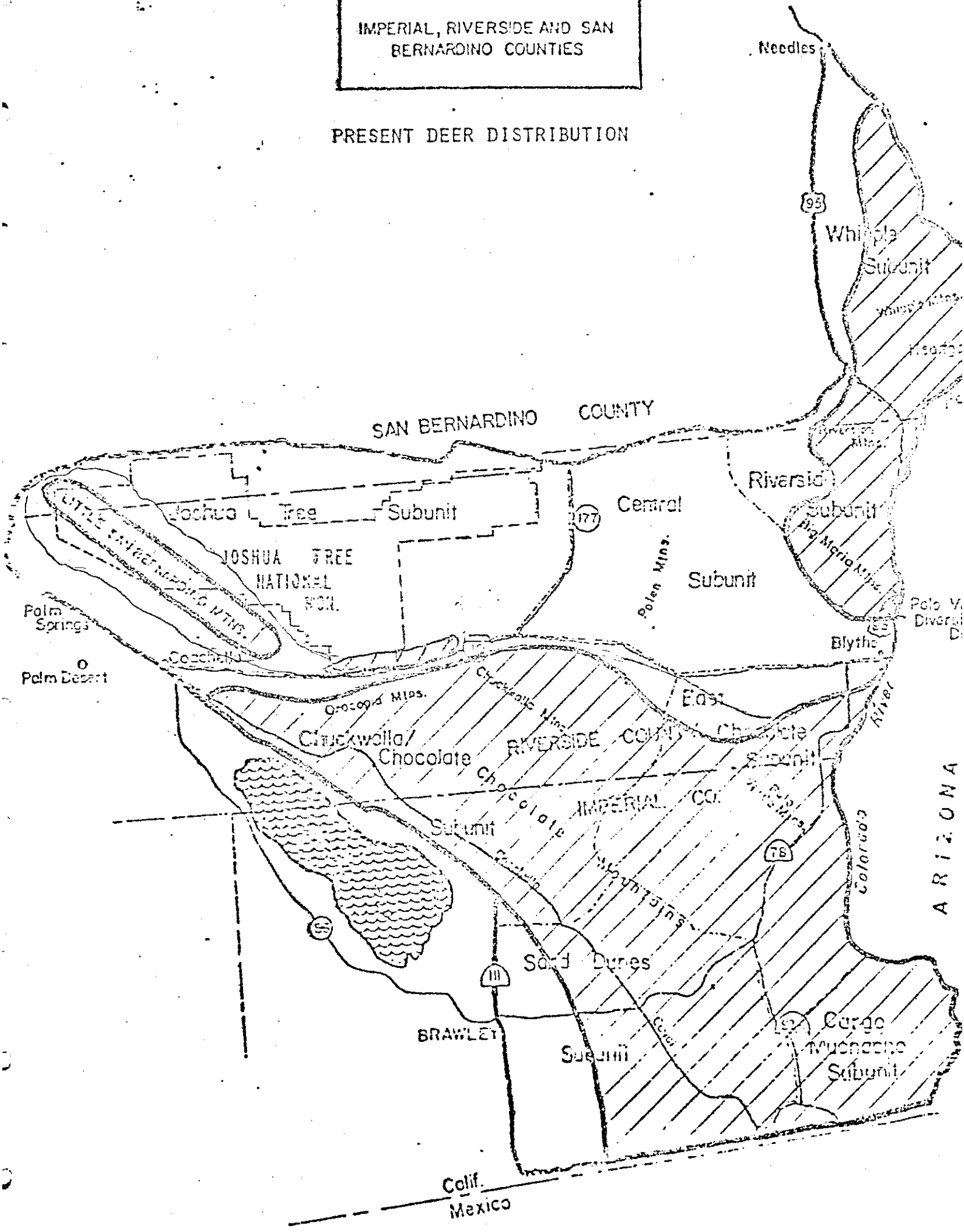



BURRO DEER HERD
IMPERIAL, RIVERSIDE AND SAN BERNARDINO COUNTIES
Needles
95
Whipple Subunit
Whipple Mtns.
Headgate
Parker
SAN BERNARDINO COUNTY
Riverside Mtns.
Riverside Subunit
Joshua Tree Subunit
LITTLE SAN BERNARDINO MTNS.
JOSHUA TREE NATIONAL MON.
Central Subunit
Palen Mts.
Big Maria Mts.
Palm Springs
Coachella
Palm Desert
10
Orocopia Mts.
Chuckwalla Mts.
Pala Verde Diversion Dam
Blythe
East Chocolate Subunit
Chuckwalla/ Chocolate Subunit
RIVERSIDE COUNTY
IMPERIAL CO.
Chocolate Mountains
Pala Verde Mts.
78
Colorado River
ARIZONA
86
111
Sand Dunes
BRAWLEY
Canal
Cargo Muchacho Subunit
Calif.
Mexico

BURRO DEER HERD

IMPERIAL, RIVERSIDE AND SAN BERNARDINO COUNTIES

PRESENT DEER DISTRIBUTION



2. Early History

The burro deer (Odocoileus hemionus eremicus), was first named Dorcelaphus hemionus eremicus (Mearns) in 1897 from a specimen taken near the Gulf of California, in Sonora, Mexico. Longhurst and Chattin (1941) reported that burro deer are distinguished from other subspecies on the basis of cranial measurements, external body measurements and coloration. Cowan (1936) reported the present distribution of burro deer and noted a former range extension northwest through the Imperial Valley to Indio. Additionally, Hall (1927) indicated burro deer may have once ranged around the west side of the Salton Sea.

3. Estimated Herd Size

a. Historical Herd Size

Early investigators estimated the burro deer population to be between 920 (McLean, 1942) and 2,000 (Longhurst et al. 1952). Estimates made by McLean (1940) indicate a burro deer range of 4,600 square miles with an average deer density of .2 deer per square mile. Longhurst et al. (1952) estimated the population by combining separate deer density estimates for the desert and riparian areas within burro deer range.

b. Estimated Current Herd Size

Because of low density and scattered distribution of burro deer, an accurate population estimate would be a difficult and costly task. Consequently, herd size is referred to in relative terms based on annual climatic conditions, plant productivity, herd composition and harvest data.

During the past 10 years, favorable climatic conditions and subsequent high plant productivity have generally prevailed on the Colorado desert, Figure 2B. Herd composition and harvest data acquired during this period would indicate an increase in deer numbers in repsonse to the favorable range conditions. Presently, the herd size is thought to be high.

c. Population Size Trends

Favorable weather during recent years has lead to better range conditions and contributed to increased recruitment and fawn survival. The deer kill trend (Figure 3) is a reflection of increased ORV use and hunting pressure since 1945.

4. Composition and Harvest Information

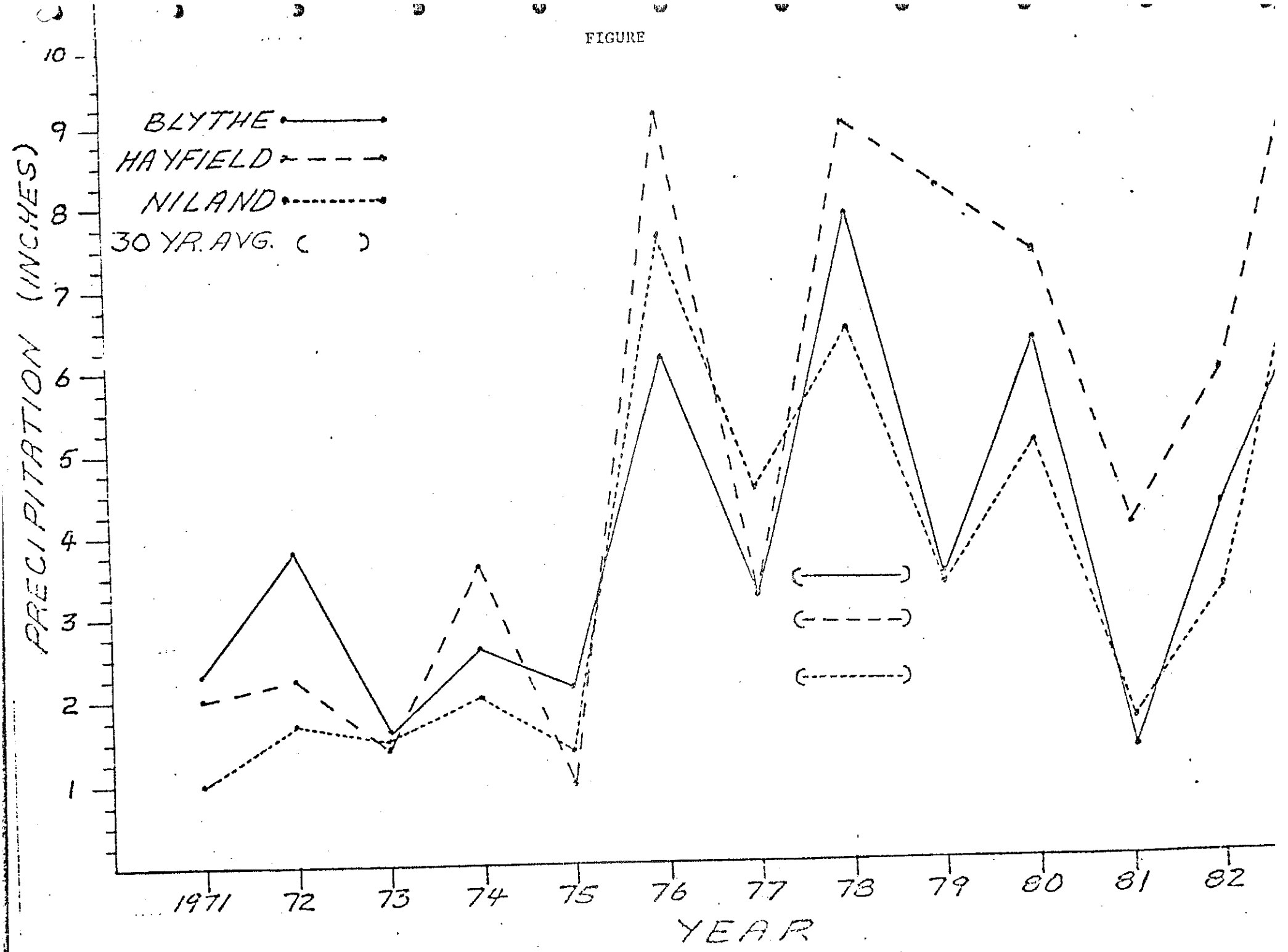
a. Herd Composition

Routine herd composition surveys have not been conducted on the burro deer herd unit due to the large area and low deer density. However, a limited amount of herd composition and fawning data have been obtained using aerial and mobile ground telemetry during the burro deer study (Table 1). Sex ratio and age structure information was obtained by utilizing fixed-wing aerial telemetry during the 1981 and 1982 breeding period and helicopter telemetry during the fawning period of that year. In 1981, fawning surveys involved only deer in riparian habitats of the Colorado River. The 1982 fawning inventories were conducted in alluvial woodland, desert dune, and riparian forest habitats.

b. Harvest Information

The reported buck kill data for the years 1927-1982 (Figure 3) reveal an annual harvest with a high of 39 bucks in 1981. Most of the harvest occurred in Imperial County, with a few bucks taken in eastern Riverside and San Bernardino Counties. The mean

FIGURE


BLYTHE
HAYFIELD
NILAND
30 YR. AVG. ( )
PRECIPITATION (INCHES)
10
9
8
7
6
5
4
3
2
1
1971
72
73
74
75
76
77
78
79
80
81
82
YEAR

FIGUR 3.

Reported Burro Mule Deer Harvest
Imperial, Riverside(Eastern),
and San Bernardino(Eastern) Counties

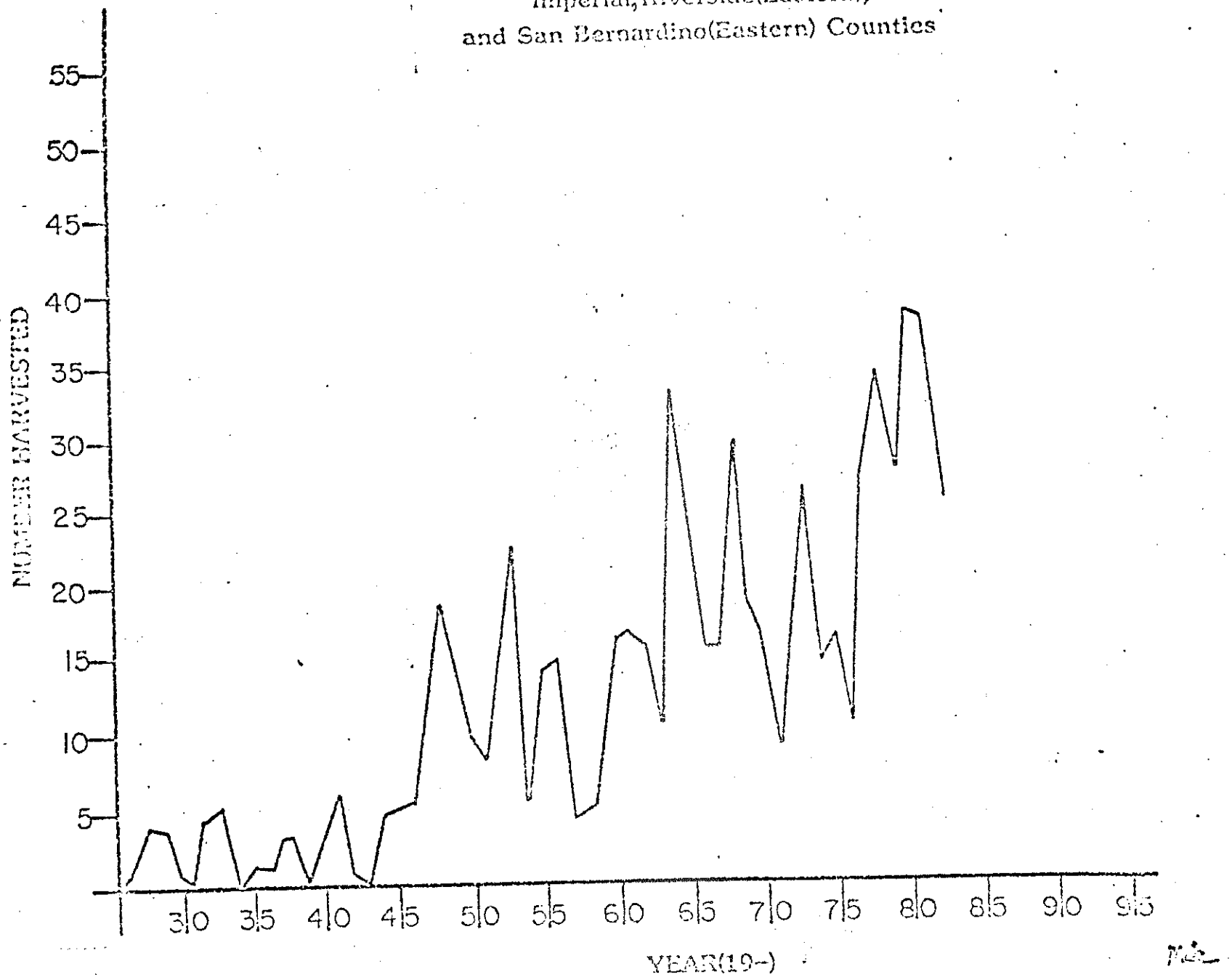


TABLE 1

BURRO DEER FAWNING SURVEY

Year	No. Fawns	No. Does	Fawn: Doe Ratio	Comments
1981	26	40	65:100	Four adult radio-collared does produced single fawns, four others were observed without fawn(s). The remaining collared does were yearlings and probably did not contribute to recruitment due to immaturity.
1982	41	72	56:100	The majority of observations occurred in riparian areas of the Colorado River.

annual buck kill for 10-year periods is also depicted by Figure 4. A pronounced increase has occurred in hunting in the desert since 1947, with the growth of Southern California and development of off-road vehicles.

Buck kill age data has been collected for 1979 to 1982. Age structure was determined by incisor cementum analysis. With 48% (63 of 131) of the reported kill sampled, the 3 years or older age class comprised 40-64% of the harvest with a mean of 50%. This suggests a moderate kill and also indicates an adequate number of bucks are within the older age classes. Table 2 shows the age structure of the buck kill.

Areas of highest reported buck kill density in the burro deer range are shown in Figure 5. Most of the bucks are taken in the Chocolate Mountains and in the drainages that empty into the Colorado River Valley, south of Palo Verde. Despite the designation of the Chocolate Mountains as a Naval Aerial Gunnery and Bombing Range with its inherent closure to entry, many of the local Imperial Valley deer hunters traditionally harvest approximately half of the bucks killed in Imperial County in this area.

FIGURE 4.

10-YEAR AVERAGED BUCK KILL

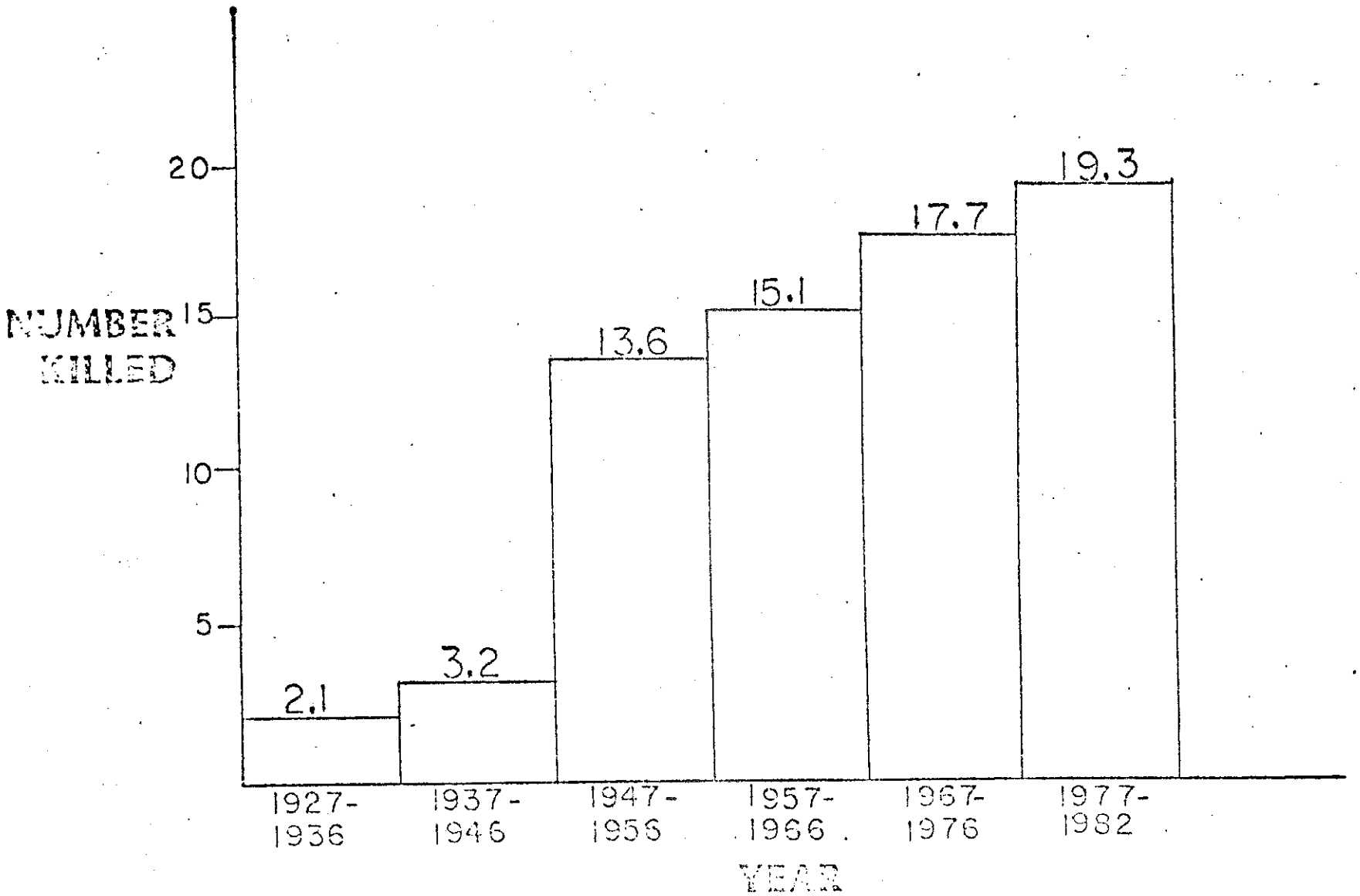


TABLE 2

AGE AND PERCENTAGE RATIOS OF 63 BUCKS

KILLED IN ZONE D-12 DURING 1979 TO 1982 SEASONS

	AGE CLASS			
	1	2	3	4+
1979 (#)	4	3	3	3
1979 (%)	31	23	23	23
1980 (#)	2	7	6	3
1980 (%)	11	39	33	17
1981 (#)	0	9	3	3
1981 (%)	0	60	20	20
1982 (#)	3	3	3	8
1982 (%)	17	17	17	47

All deer were aged by incisor tooth cementum analysis

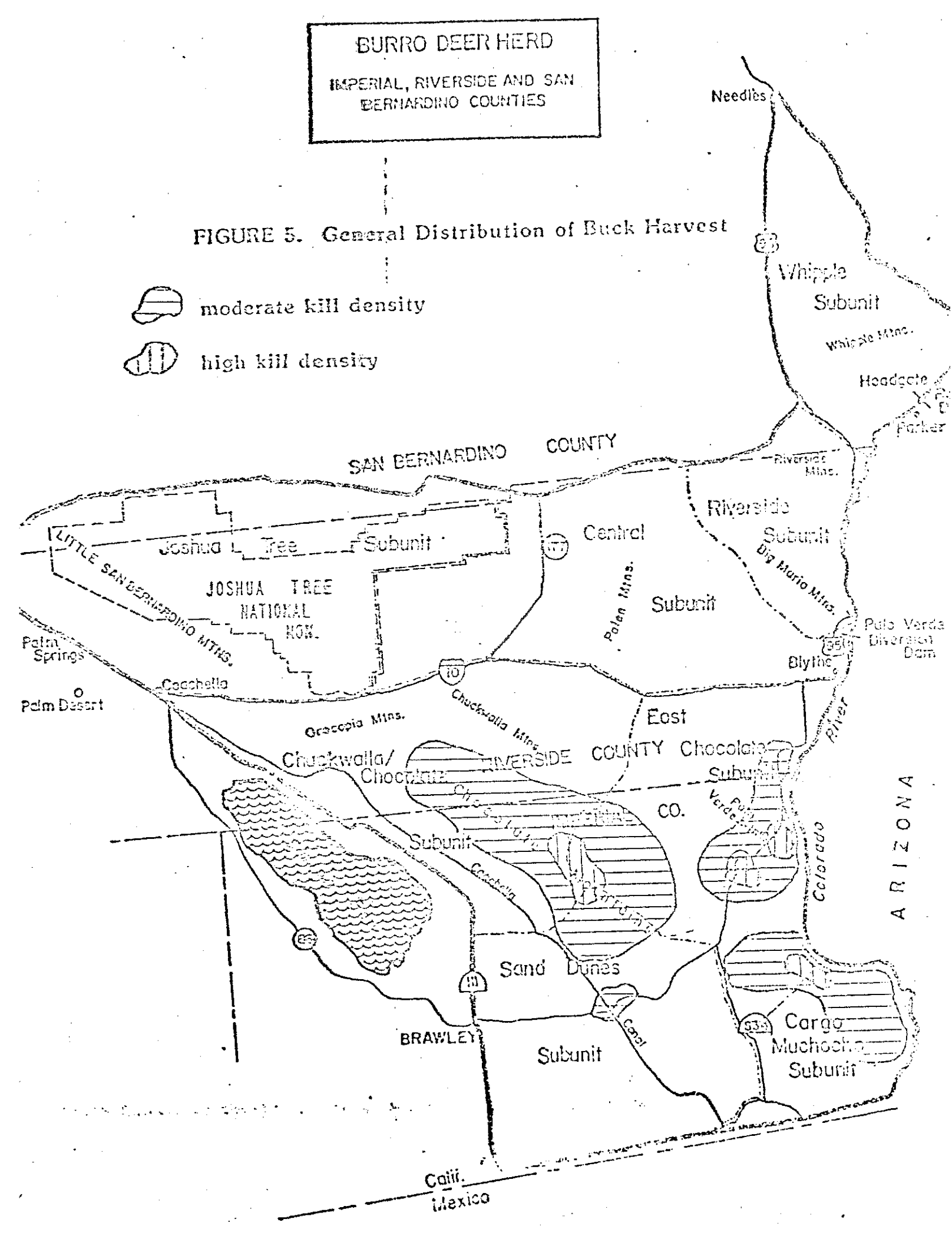


FIGURE 5. General Distribution of Buck Harvest

5. Breeding Biology

Aerial telemetry information indicated that breeding starts in January and continues into March. Most of the aerial observations of bucks and does together were made in February. Results from field observations, helicopter telemetry surveys, and mobile ground telemetry have placed the fawning period from early August through mid-October with most of the fawns being born in early September. Fawning takes place both in riparian and desert areas (See 4. a. Herd Composition and Table 1).

6. Mortality Factors

a. Illegal Kill

The area inhabited by the burro deer is too vast, with inumerable washes, to allow an accurate picture of illegal kill as it affects this subspecies. This is the concensus of the game wardens who patrol the area. Wildlife Protection personnel surmise that the poaching to legal kill ratio is 2:1 and poaching is believed to be a substantial mortality factor to burro deer. Several reports are received during the year regarding illegal activities, although hard evidence is seldom uncovered.

A similar problem exists with illegal kill during the hunting season. Illegally taken deer usually are not brought to the attention of Wildlife Protection personnel, although informants report that such activity does occur. It appears that this is a problem of a very large patrol area and too few enforcement personnel.

b. Road Kill

Accidental death, road kills by automobiles or kills by train hits are routine causes of death for a number of burro deer every year. Estimates by local wardens suggest road kills account for 15 deer and train strikes for 10-12 deer each year.

c. Predation

Predation is another cause of mortality among burro deer. Its extent and the infleunce each predator species exerts on the herd is not known. The principal predators are the coyote (Canis latrans), mountain lion (Felis concolor), and bobcat (Felis rufus). Scattered reports of the presence of mountain lions throughout the burro deer range persist and there can be no doubt they are present. Although mountain lions take the most deer per individual, the

burgeoning wild burro population could be serving as an alternate prey base, thereby minimizing the deer kill. Coyotes and bobcats are capable of preying upon deer in the desert, but their impacts to deer are largely undocumented. During years of good forage production in the riparian zone, the omnivorous coyotes appear to subsist on rodents, insects and the seeds of screwbean and honey mesquite (Anderson and Omart in press). However, during periods when these food sources are scarece, deer, especially fawns, might become an important food item.

d. Disease and Parasites

During the capture phase of the telemetry study, blood samples were drawn from seven deer. Subsequent analyses indicated all had been exposed to blue tongue (BT) virus. Titers for brucellosis, infectious bovine rhinotracheitis (IBR), Leptosperosis, anaplasmosis and para influenza-3 were negative in all seven deer. Bovine virus diarrhea (BVD), titers were positive in two deer and negative in the remaining five. Results of the lab analyses are shown in Appendix 1. Papillomae (skin tumors) and lesions have been observed in burro deer. The severity of this disease is believed to be minimal because of its infrequent occurrence and low herd density. Bot-fly larvae, tapeworms and arterial worms have also been noted to infect burro deer.

e. Canal Deaths

During 1980, 1981, and 1982, a minimum of 29, 14, and 4 deer, respectively, drowned in the northern half of the cement-lined Coachella Canal (California Highway 78 north of Niland). This impact has probably caused a significant reduction in the local burro deer numbers. The drowning hazard has been abated recently as a result of several factors: the installation of 19 windmill well drinkers along the canal impact area, favorable rainfall resulting in more water sources and nutritious green feed, and cooler weather. Other canal-related hazards include vehicle collisions, hypothermia, stress, and injuries to the legs and feet of deer attempting to climb out of the canal. Injuries sustained in the canal no doubt predispose deer that escape to infection, disease, and predation. Deer rescued from the canal were marked or radio collared, which revealed that most of the escaping deer probably do not survive.

7. Research Projects

a. Hunter Questionnaire Survey

Prior to the 1979 and 1980 hunting seasons, 392 and 360 questionnaires were distributed respectively to 39% and 30% of the tag holders for those years. See Appendix 2 for a sample questionnaire.

The survey documented hunter success and age classes of bucks taken. Hunter residence, areas hunted, time spent hunting, and opinions concerning dates of the season were obtained. The results of both surveys are summarized in the 1982 Burro Deer Study Progress Report.

b. McClean, Donald D 1930 - The Burro Deer in California

This brief report provides a general account of burro deer seasonal movement behavior and geographical distribution. It is based on an inventory of burro deer habitats and seasonal movement behavior conducted during the week of December 14-20, 1929.

c. Longhurst and Chattin - 1940

In early January, 1940, Longhurst and Chattin visited the Colorado River region and collected three burro deer for taxonomic comparison with other sub-species in surrounding areas. This report describes the distinguishing characteristics of burro deer and provides a brief, general description of burro deer habits and habitat.

d. Study of Burro Deer Seasonal Movement Behavior and Habitat Preferences - 1980 to 1983

To obtain basic information on seasonal movement patterns and habitat preferences, 11 burro deer does were captured and radio collared at five different representative areas within hunt zone D-12. Subsequent monitoring has been conducted aerially at approximately ten-day intervals during 1980-81 and monthly intervals in 1981-83.

Additional information on daily movement patterns and water requirements was obtained by stationary ground telemetry. In conjunction, a continued program to inventory vegetation and deer habitat preferences is also being conducted.

e. USBR - ASU Study of Deer Utilization of Riparian Habitat Along the Lower Colorado River - 1982

This study was performed by Arizona State University biologists under contract to the U.S. Bureau of Reclamation. In cooperation, the Department provided aerial telemetry deer location data. Supporting information on burro deer management in riparian zones as discussed in this plan is available in a final report which will supplement the burro deer study report.

f. Algondones Dunes Vegetation and Deer Use Inventory

Subsequent to the installation of windmill water sources in the Algodones Dune Pockets, in the sand dunes sub-unit, inventories were conducted to obtain indices of deer use at windmill sites. See Appendix III.

g. Region 5, W-26-D, Big Game Guzzler Transects

To measure deer, the regional Habitat Improvement Crew has installed permanent pellet plot transects at all of the big game guzzlers in the Region. These transects are read during each inspection or maintenance visit.

B. Herd Range Description and History

1. Topography

The topography of southeastern California is characterized by extensive, low-lying plains and steep, isolated mountain ranges bordered by low hills and alluvial fans. Elevation varies from below sea level in the Imperial Valley to 5,600 feet in the higher mountains. Most of the area is low desert, with elevation ranging from about 100 to 2,000 feet.

2. Soils

Most of the Sonoran Desert is characteristically dry aridisols. They are generally coarse textured, poorly developed and low in organic matter. Because these soils are not subject to intensive leaching, they are often high in mineral content. In some relatively small isolated portions of the desert, i.e. Algondones Dune pockets, fine textured, productive soils have developed by repeated seasonal accumulation of runoff water and alluvium. Where this has occurred, important, high-quality habitats had evolved. These areas are particularly important to burro deer because their high vegetation diversity, when supplemented by water developments, can support deer during the hot critical periods when the vegetation in other desert communities is seasonally low in productivity and diversity (Appendix 3).

The soils of the agricultural valleys are entisols, with a loamy or clay texture. Being floodplain soils, they are generally well developed and highly productive. Most of these soils are used for agriculture in the Imperial and Palo Verde Valleys. They also support the vitally important riparian zones which occur at Lost Lake and in the Cibola and Imperial National Wildlife Refuges.

3. Climate

Climate conditions vary from extremely hot, dry summers with high temperatures averaging 110 degrees during peak summer periods, to cool temperate winters with high temperatures averaging 70 degrees and lows around 30 degrees.

Average annual precipitation is about three inches. Winter rainfall from pacific storms generally occurs from November to March. Summer rainfall occurs between July and September, when tropical disturbances bring heavy localized thundershowers (Bailey 1966).

4. Vegetation

Burro deer occupy a wide diveristy of plant asociations which are found in six different habitat types including desert dunes, sonoran desert scrub, riparian forest, alluvial woodland, alluvial and riparian scrub, and Joshua tree woodland.

Classification of habitat and vegetation types is based on the California Natural Diversity Data Base (CNDDB) Outline of California Natural Communiities. This system is a modification of the Annotated List of California Habitat Types by N.H. Cheatham and J.R. Haller (1975).

5. Land Ownership

Nearly 70% of the land which comprises the burro deer range in California is publicly owned (Table 3). This land is under the jurisdiction of seven different state and federal agencies and therefore subject to a diversity of land-use policies which may often directly conflict with deer management objectives. Although private lands comprise a smaller area within the burro deer herd unit, serious conflicts with deer management objectives can be expected because most of these lands are located adjacent to the Colorado River on key summer ranges.

6. Seasonal Ranges and Habitat Preferences

The burro deer herd unit (hunt zone D-12) covers 7,026 square miles and contained a variety of habitats which support migratory and resident deer.

A typical migration pattern involving the deer along the Colorado River can be characterized as follows. In late summer, deer move away from the river to the desert mountains and in late spring they return to the river. Migration routes follow the major desert wash systems.

TABLE 3

LAND OWNERSHIP BURRO DEER UNIT

LANDOWNER	Square Miles	%
Military Reservation	89	1
Bureau of Land Management	3,265	46
National Monument	858	12
Indian Lands or Reservations	179	2
Patented Lands (includes railroad, State and other private lands)	1,822	25
State Lands	162	2
Bureau of Reclamation	616	8
National Wildlife Refuge	26	.3
State Recreation Area	9	.1
Totals	7,026	100

The use of different seasonal ranges by migratory deer appears to be based on: 1) distribution of water, and 2) phenology of key forage species on seasonal ranges. During the summer months water availability is critically important, so burro deer are located within close proximity to either the Colorado River, Coachella Canal, or All American Canal. According to some local residents, a few deer remain near long-established, dependable water sources such as Beal's Well in the Chocolate Mountains. In addition, key forage species of the Colorado River riparian woodlands, where most deer concentrate during the summer, are at peak growth and nutritive levels during that period. Summer thunderstorm activity usually begins in late July and continues into early September. This generally coincides with a progressive cooling trend. With cooler temperatures, water requirements are lowered and most deer migrate to desert mountain habitats where limited, but sufficient water is available in natural tanks, springs, wells and big game guzzlers.

As the cool season progresses (generally by December), the primarily deciduous vegetation of the riparian woodlands becomes leafless and has lowered values as either food or cover. But in the desert, fall and winter precipitation have improved water distribution and a wide diversity of food and cover plants have become available; consequently, the desert habitats are more preferable to deer during that period.

Seasonal movements occur in the major drainages which flow from the desert mountains to the Colorado River to the east and the Salton Sea to the west. These migration corridors are desert dry wash woodland plant communities. They are generally large, sandy dry washes dominated by ironwood (Olneya tesota) and palo verde (Cercidium spp.); plants which provide a major source of food and cover for deer. An intermixture of lower shrubs are also found in these areas.

a. Winter Range - Upon reaching winter range, most burro deer continue into the foothills where they inhabit maze-like wash complexes near the base of steep, rugged, semi-barren mountains. The habitat types are Sonoran desert scrub and alluvial woodland. Palo verde and to a lesser degree ironwood may occur in the smaller washes, but not in the size or density that they are found in the larger drainages.

b. Intermediate Range - Intermediate range habitat is similar to that of winter range, except deer appear to use the larger washes to a greater degree.

c. Summer Range - During summer period, most migratory burro deer occupy the riparian habitat which mainly occurs on old floodplains and alluvial fans at the

outflows of major washes along the Colorado River. The most extensive tracts of riparian growth occur at Lost Lake on Colorado River Indian Tribes land, north of Blythe and at the Cibola and Imperial National Wildlife Refuges south of Blythe. These areas contain large stands of willow (Salix spp.) and screwbean mesquite (Prosopis pubescens), intermixed with saltcedar (Tamarix pentandra). This association provides excellent forage and cover.

Resident deer also occupy these areas, utilizing proximal alfalfa fields year-round and nearby dry wash woodlands during the winter.

Although most burro deer occupy the Colorado River riparian woodland during the summer, some use areas near the river and major canals where riparian vegetation is absent or occurs only in small, isolated parcels. These deer utilize the nearby large dry wash woodland communities as summer range. Where small riparian pockets are present, they are periodically used, especially when daily temperatures reach extremely high levels (>110^{o}F).

Along a portion of the Algodones Dunes, near the Coachella Canal, good forage and thermal cover are provided to deer which concentrate in that area during the summer.

Common plant species for the winter, intermediate and summer ranges are listed separately in Appendices 4 and 5.

Data from the burro deer telemetry study show distance between seasonal ranges varies according to geographical area. Deer which mainly occupy desert habitats migrate relatively long distances (15 to 30 miles) between summer and winter ranges and utilize an intermediate range enroute (Appendice 6, 7 and 8). These deer occur in the Whipple Mountains, Chuckwalla Mountains, and the western portion of the Chocolate Mountains.

Along the Colorado River most migratory deer travel from 2 to 8 miles between summer and winter range and do not occupy an intermediate range (Appendices 9, 10 and 11).

d. Home Range Size - Burro deer home range size varies considerably according to season and habitat. As deer movements are restricted during the hot summer months, individual home range size is comparatively small. During this season, deer occupying Colorado River riparian woodland use about one square mile, while home range size of deer in dry wash woodlands varies

from 2 to 8 square miles. This is probably a result of the lowered forage density and seasonal produtivity in desert habitats during this period.

Intermediate home range generally comprises an area of 15 to 25 square miles. These areas are utilized for relatively short periods (6-8 weeks).

During cooler months, movements are no longer restricted by high temperatures and limited water distribution. This is reflected in the extensive size of the winter home range, which may vary from 30 to more than 50 square miles. See Appendices 6 through 11 for a comparison of seasonal home range sizes.

e. Fawning Areas - Burro deer are known to fawn in both desert and riparian habitats. A radio collared doe was observed to fawn in riparian habitat one year and the desert upland the following year. Generally, fawning begins during the summer rainfall period in early August and coincides with the emergence of annual plants and new perennial growth. Observations made during fawning surveys in the desert showed most fawning occurred in areas characterized by low, broken hills with a network of interconnecting small washes containing palo verde, catclaw, and a diversity of shrubs, forbs, and grasses. Reports from local

sportsmen indicate fawning also occurs in the larger dry wash woodlands dominated by ironwood and palo verde. In all cases, a dependable water source was within one mile.

In riparian zones, newborn fawns were observed in densely vegetated areas dominated by screwbean associated mesquite with willow and saltcedar. Plant species found in desert and riparian fawning areas are included in Appendices 6 and 7.

7. Wildlife Habitat Improvement Projects

Water appears to be the most significant limiting factor to most desert wildlife. Consequently, improved distribution of permanent water sources has been the primary objective of desert wildlife habitat management efforts. Emphasis has been placed on water development to benefit bighorn sheep; although development of water primarily for deer use has increased considerably since 1981.

In addition to DFG sponsored water source developments, and cooperative programs with BLM and BR, water source distribution has been achieved by Desert Wildlife Unlimited (DWU). This is a wildlife conservation organization based in the Imperial

Valley. The DWU projects have been focused in and around the Chocolate Mountains and have included the development of 11 water sources and one vegetation enhancement project. A list of deer water source developments and their relative locations are shown in Appendices 12 and 13 respectively.

8. Special Land Use Areas

Within the burro deer herd unit are a number of areas where management proposals are either impossible to implement or require additional planning and coordination with other management objectives. These special land use areas include the Chocolate Mountains Military Zone; Joshua Tree National Monument (JTNM); Colorado Indian Tribes land, the Cibola and Imperial National Wildlife Refuges and Picacho State Recreation Area and Picacho National Cooperative Land and Wildlife Management Area.

a. Chocolate Mountain Military Zone

This area in Imperial County is comprised of approximately 80 square miles. Withdrawn by the U.S. Navy from the BLM, it is used as a live bombing and gunnery range. The Department of Fish and Game (DFG) is in the process of formulating a

cooperative agreement with the U.S. Marine Corp which has assumed responsibility for the gunnery range. The agreement goal is to provide adequate protection and enhancement of fish and wildlife resources of the Chocolate Mountains Aerial Gunnery Range. Accordingly, the end result will benefit burro deer habitat.

b. Joshua Tree National Monument

The JTNM is another large area where the land use patterns will probably remain static for several years. This stability should prove beneficial to burro deer in the sense that habitat deterioration will take place in other parts of the range but will not occur in the Monument. The JTNM consists of 558,000 acres and is located in Riverside and San Bernardino Counties in the northwestern portion of the burro deer range. The land uses on the Monument are administered by the National Park Service and any management proposals for burro deer must be coordinated with National Park concepts.

c. Indian Lands

Indian lands on the Colorado River are under jurisdiction of the Colorado River Indian Tribes. In California, these lands include the Chemehuevi Mountains south of Interstate Highway 40 and the riverfront lands extending 44 miles south from Headgate Rock Dam to the vicinity of Palo Verde Diversion Dam.

The Colorado River Indian Tribes abide by the game regulations set forth by the states of California and Arizona but only tribal members are allowed to hunt deer on the reservation. Either sex hunting is presently permitted. Although there is cooperation between the Department and the Indian Wildlife personnel, increased coordination on matters of harvest strategies, assessment of harvest impacts and maintenance of habitat is needed for assurance that deer numbers will be maintained at healthy levels.

d. Cibola National Wildlife Refuge (CNWR)

Located about 15 miles south of Blythe, the CNWR is operated by the U.S. Fish and Wildlife Service. It is comprised of 16,627 acres on a large

floodplain of the Colorado River. Approximately 25% of the refuge is in California. Management at CNWR is primarily for waterfowl and other migratory birds, but over 8,400 acres is riparian forest, woodland, and scrub habitat. This extensive area is vitally important summer range and contains the largest seasonal concentration of burro deer along the Lower Colorado River.

Although there is no official deer management policy at CNWR, refuge personnel conduct annual herd composition counts and would welcome suggestions for cooperative programs to improve herd and habitat conditions on the area (Martin pers. comm.).

e. Imperial National Wildlife Refuge (INWR)

This refuge borders CNWR to the north and extends along both sides of the Colorado River for approximately 29 miles, ending at Martinez Lake. About 50% of its 25,760 acres is in California. The INWR is characterized by hilly, rugged terrain, interrupted by numerous major washes, with pockets of riparian vegetation and backwater marshes along the river. Deer use in this area is high throughout the year. Because INWR extends

over a lengthy portion of the river and contains such a wide diversity of habitat types, it is critically important to a large segment of the burro deer population.

As with CNWR, INWR has no official deer management policy and is primarily managed for waterfowl and other migratory birds. However, any proposals for a cooperative program to enhance herd and habitat conditions on the refuge would be welcomed (Behrens pers. comm.).

f. Picacho State Recreation Area (PSRA)

The PSRA is operated by the California Department of Parks and Recreation (CDPR). It is located along a 9.5 mile section of the Colorado River which borders the INWR on the north and south. It contains approximately 7,000 acres of desert scrub, alluvial woodland, and riparian woodland habitat. As with the federal wildlife refuges on the Lower Colorado River, PSRA has high habitat values and is critically important to burro deer.

Although management is primarily for recreation, park personnel have expressed a willingness to cooperate on any proposals for improving herd and habitat conditions on the area (Artega pers. comm.).

g. Picacho National Cooperative Land and Wildlife Management Area

This 44,685-acre parcel located in eastern Imperial County has been cooperatively managed by BLM and DFG since 1963, when it was designated for withdrawal status to maintain and enhance its important wildlife values. It is typically Colorado Desert with highly diverse terrain features including steep mountains associated with foothills and interconnecting washes which provide excellent burro deer habitat. Because of its unique status and high quality habitat this area should be considered in future planning for burro deer management.

C. Major Factors Regulating the Population

The complex set of factors which affect burro deer numbers fall into two general categories: human influences and environmental influences.

1. Human Influences

a. Agricultural and Residential Expansion

Palo Verde Valley - In 1910, Grinnel described the Palo Verde Valley as being mostly vegetated by willow-cottonwood associations, intermixed with screwbean. Although agriculture was established at that time, it was a risky business because of the annual flooding and changing of the river's course. With the improvement of flood control measures and irrigation in the 1930's, agriculture expanded considerably. Most of the farms were small however, and clean farming was not practiced, so impacts to deer at that time were probably minimal and might possibly have been beneficial depending on the crops grown.

Most large-scale development occurred in the Palo Verde Valley between 1945 and 1950. During that period, vast acreages of native vegetation were removed in the northeastern and southern portions of the valley for conversion to agriculture (Werdon pers. comm.). Since the later 1950's, continued agricultural expansion and residential developments have removed nearly all of the deer habitat in the Valley. Deer still use fringe

areas at the south end near Palo Verde and a few brush pockets around Goose Flats along the river, but continued land clearing will probably eliminate the remaining deer habitat in the Palo Verde Valley (except in the Cibola NWR) within 5 to 10 years. This will probably affect 20 to 30 deer.

Colorado River Indian Lands - In California, the Parker Division of the lower Colorado River extends 44 miles from headgate Rock Dam at Parker, Arizona south to the vicinity of the Palo Verde Diversion Dam, north of Blythe (Figure 2). On the California side of the river, 41 miles of riverbank and adjacent lands are owned by the Colorado River Indian Tribes. Two isolated burro deer subherds occur in the Parker Division. They include: 1) Whipple Mountains subherd, and 2) Riverside Mountains subherd.

From Headgate Rock Dam to Alligator Bend, much of the land along the California side of the river is on sparsely vegetated, elevated mesas bordered by dry washes draining to the river. Generally, most of the land has remained undeveloped. A notable exception is the vicinity of Deer Island, 4 miles south of Parker. In this area a series of major

washes draining the Whipple Mountains have deposited large amounts of alluvium into the river. This has resulted in an extensive riparian zone, covering 2 miles of shoreline and a 1.7-mile offshore section known as Deer Island. Based on reports of long-time residents, the riparian zone was utilized during the summer by most of the Whipple Mountains deer (Werdon, pers. comm.).

In 1968, construction of a large residential development known as Big River began on the mesas adjacent to the shoreline riparian zone. Since then, deer density indicators, including tag returns, reports of road kills and random sightings, have suggested deer numbers in that vicinity have seriously declined. The Big River tract is still expanding and can be expected to eventually eliminate all deer use in that area.

Alligator Bend is located adjacent to the Riverside Mountains. It is the major portion of a 6,000-acre riparian zone which is the largest contiguous riparian habitat on the California side of the river, north of Blythe. This area is the summer range for the Riverside Mountains subherd. Presently, the only development in the area is Lost Lake Resort, a small residential-

recreational complex. The resort appears to have had little impact on the deer, because it has remained small and the surrounding riparian habitat has been left standing.

At the present time, proposals to fully develop the entire Lost Lake area are being considered by the Tribal Council. Development would be in conjunction with recent USBR proposals for channelization and bankline stabilization of the entire Parker Division. Most of the land is being slated for agricultural production, but areas next to the river will probably be developed for recreation.

If the Lost Lake area is developed to its full potential for agricultural and recreational purposes, the Riverside Mountains subherd will suffer severe losses, as most of their summer range forage, cover and access to water will have been removed. In addition, these deer will be subjected to a high incidence of road kill mortality because most of the remaining deer will relocate to the dry wash woodlands across the adjacent highway (U.S. Highway 95) for cover and forage, then cross the highway at night for water. The two lane highway is narrow and undulating,

corresponding to the hilly terrain which is transected by numerous washes. Traffic visibility is limited from one dip in the road to the next. Nevertheless, most vehicles travel at high rates of speed. Under such circumstances, serious consequences in terms of heavy deer losses and a dangerous traffic safety hazard can be expected when intensive development of this area occurs.

South of Alligator Bend, much of the river front land is on a floodplain, characterized by river bends and braided channels. Historically, this area supported extensive stands of riparian and alluvial woodland habitat. Now most of it is leased for agriculture or recreational and residential developments. Since the early 1960's, recreational activities have substantially increased along this portion of the river and with the increased popularity of off-road vehicles (ORV's), the area has become a year-round center for ORV activities. In addition, agricultural expansion and "clean" farming methods have eliminated much of the riparian vegetation. Consequently, deer use has seriously declined and at present is low.

In recent discussions between tribal representatives and Department personnel, the problems with development vs. deer maintenance were discussed. At that time, tribal representatives expressed their concerns and a willingness to accommodate the needs of the Riverside Mountains deer. Further discussions will continue.

Desert Areas - Because of lack of suitable soils and sufficient irrigation waters, agricultural development in the desert has historically been considered impractical. However, since the late 1970's cultivation of the jojoba plant has become an increasingly popular enterprise. Jojoba is a native plant, well suited to the soils and climate of the Sonoran Desert. As demands for its derivatives increase, so will the need for lands to cultivate it.

Within the past five years more than 4,000 acres of land near Desert Center have been cleared for jojoba cultivation, and an additional 5,000 acres are currently offered for sale to the public, under the federal land disposal program. These plantations are on the periphery of important deer winter range used by the Chuckwalla-Chocolate Mountains subherd.

South of Palo Verde in the Milipitas Wash, 40 acres of alluvial woodland has been recently cleared, presumably for the establishment of jojoba plots. This development is occurring in desert washes which serve as important migration corridors for the Chocolate Mountains-Colorado River subherd.

Although the ultimate effects of jojoba agriculture on deer have yet to be shown, the following results may be expected: 1) direct losses of key habitat within migration corridors and winter range, 2) increased poaching, 3) increased harrassment from free-roaming dogs and ORV's, 4) crop depredation problems and 5) and ultimate reduction in deer numbers within the affected areas.

b. Mining

Mineral mining has occurred in the southeastern desert for over a century. Until the 1930's, when mining activities declined, mining operations were numerous but generally small. In the early 1970's, mining activities resurged. Contrary to most of the older operations, modern efforts are

on a larger scale and are heavily mechanized. Consequently, the potential for large-scale habitat degradation is much greater than in the past. Mining operations cause the direct loss of vegetation and result in human disturbance of wildlife near water sources. Roads created by these operations result in increased ORV activity. In recent years significant increases in mining activity have adversely affected deer winter range in the Chuckwalla Mountains near Chuckwalla Spring and in the East Chocolate Mountains near Picacho Peak. Presently, extensive mining explorations in the Riverside and Whipple Mountains are posing serious threats to deer habitat in those areas. In addition to mineral mining, large-scale geothermal exploration is planned for the Chocolate Mountains area outside the military zone.

As the current trend toward development of mineral and geothermal resources continues, a resultant decline in the quality of habitat on winter range can also be expected.

c. Off-Road Vehicles

Uncontrolled ORV activity is one of the most serious threats to burro deer. Although ORV recreation is popular throughout much of the southeastern desert, most of the impacts are focused near the river front recreation camps such as Aha Quin, Red Rooster, Water Wheel, and Lost Lake Camps north of Blythe and Mitchell's, Water's and Gilmore's Camps south of Palo Verde.

Reports from residents of these areas attest to local deer being subjected to frequent chasing and harrasment by three-wheeled, all-terrain cycles (ATC's) and dune buggies. In addition, deer habitat is continually being degraded or destroyed by uncontrolled ORV operators who desregard existing regulations. Another concern stems from current ORV regulations which include desert washes in the definition of existing roads. In larger washes, impacts to vegetation by responsible ORV users could be epectedly low. However, in smaller confirmed washes, even responsible ORV users often cannot avoid running over vegetation. The significance of this problem is compounded by the fact that most of the recreational camps are located in or near critical

deer habitat where deer densities are relatively high, particularly during the summer. Because of the extremely high temperatures which prevail at that time, deer movements and activities must be minimized to avoid heat stress. Consequently, the continual, random pursuit, and harassment of deer during that time could have devastating effects to local deer populations. In addition, roads leading to important deer water sources in the desert should be permanently closed within one-half mile of the source, to decrease human disturbance.

d. Competition

Prior to World War II, livestock were seasonally grazed over various portions of burro deer range. However, since that time livestock grazing within the herd unit has declined to include one ephemeral sheep grazing lease at Ford Dry Lake and a cattle grazing lease by the Chemehuevi Indian Tribe. According to BLM policy, livestock grazing is only permitted during years when forage producitivity exceeds 200 lbs per acre.

5) Over 90% of the harvest occurred in Imperial County. This was primarily a result of the close proximity of population centers like El Centro, Brawley, and Indio to areas of good habitat and high deer numbers such as the Chocolate Mountains and the Lower Colorado River.

6) Most bucks harvested had antler development of three or more points.

7) Regarding the hunting season, most hunters approved of the time of year but felt the presently established 3-week season was not long enough.

f. Illegal Take refer to Section II A-6, Pages 10 and 11.

g. Other known Mortality Factors include road kill, predation, disease and parasites, and canal death, Refer to Section II, A-6, paghes 11-14.

2. Environmental Influences

Climate - Precipitation is the most significant environmental factor influencing burro deer numbers. Two distinct annual precipitation patterns occur on the Colorado Desert.

The first pattern usually occurs between July and September. Rain is provided by scattered heavy thundershowers which recharge desert water sources and stimulate new vegetative growth in the desert. This allows the deer, which have been restricted to relatively small summer ranges, to travel over large areas and select from a wider diversity of forage types.

The second precipation pattern usually begins in November and continues through the winter until late March. Precipitation during this period is vitally important for production of cool-season forbs, which are the most nutritious food items in the desert deer diet (Urness et al. 1971; Urness and McCulloch 1973). To be effective, winter rainfall must be in sufficient amounts and occur at fairly regular intervals throughout the season.

III. MANAGEMENT UNIT GOALS

The primary goal for the management of burro deer conforms to the statewide plan to restore and maintain healthy deer herds and provide for high quality diversified use of deer. In most of California's deer habitats, deer densities are high enough to provide representative samples upon which accurate population estimates can be made. However, in the Colorado Desert, deer densities are generally low. As yet, no methods to obtain representative sample sizes large enough to provide a valid index to the population size have been developed. Consequently, herd goals cannot be quantified with specific numbers of deer but rather in terms of relative size and trend based on the most reliable indicators presently available.

It is apparent that in recent years, climatic conditions have contributed favorably toward the maintenance of the burro deer herd. However, in the future, human activities will continue to increase on the Colorado Desert and adverse climatic conditions will periodically occur. Considering that these factors will probably exert a strong negative influence on burro deer during the next 10 years, the most realistic herd goal would be to maintain the population at its present level.

on a similar basis, the primary goal for habitat management should be for the continued maintenance of habitat quantity and quality on both summer and winter ranges.

The following analysis evaluates criteria established to define goals for the burro deer herd.

A. Potentials for Deer Herd Maintenance

The factors involved in deer herd maintenance can be divided into two categories, those which affect habitat carrying capacity and those which directly affect herd mortality. These factors are presented, along with their estimated potentials in a "worst case" vs. "best case" scenario (Tables 4 and 5). The potentials are subjective estimates, made by Department of Fish and Game biologists and wardens most familiar with the burro deer herd unit.

1. Summer (Riparian) Range Factors

It is believed that in the "worst case" on summer range, burro deer numbers could be reduced as much as 45% within the next 10 years (Table 4). Nearly one-quarter of this reduction would be due to habitat losses from agricultural expansion and development of recreation camps in the riparian woodlands in the Riverside and Whipple subunits. These developments would be made possible by flood control

measures in the Parker II Division. Additional signficant declines in deer numbers may also be expected as a result of indiscriminate ORV activities from recreation camps effecting habitat adjacent to the large riparian zones in the Riverside, Whipple, and East Chocolate subunits.

As agricultural development continues, more extensive irrigation systems will be developed, and in conjunction, increased needs for water conservation. Thus, it is likely that most major systems will be concrete lined. As shown with the Coachella Canal problem, concrete-lined ditches can be disastrous to deer with fixed behavioral patterns and an urgent need for water. Consequently, in the "worst case", a signficant reduction in deer numbers can be expected wherever unmitigated concrete-lined ditches are built on deer range.

Under "best case" conditions, future large-scale agricultural developments could be made more compatible to deer herd maintenance by allowing relatively small patches and corridors of selected vegetation to remain in agricultural areas, thus, providing food, cover and river access to deer. ORV problems could be considerably reduced by coordinated efforts with BLM to restrict activities to areas with low wildlife values. Most concrete-lined ditch mortality could be avoided through the environmental review process by effecting pre-project mitigation measures such as establishment of alternate water sources, canal fencing and escape ramps.

Environmental factors notwithstanding these actions would allow deer herd numbers to remain static. Therefore, any measures toward habitat improvement should result in a net increase in deer numbers. As shown in Table 4, a 10% increase could be achieved through interagency cooperative programs for deer habitat improvement on key summer ranges with high potential for enhancement. These areas occur on Colorado River Indian Tribes land and at the Cibola and Imperial National Wildlfe Refuges.

2. Winter and Intermediate (Desert) Range Factors

Also shown on Table 4, land development on burro deer winter range could reduce the carrying capacity by 35% as a "worst case" over the next 10-year period. These losses would result primarily from the expansion of jojoba agriculture, mineral mining and the exploitation of geothermal, oil, and natural gas resources. In addition, new access roads created by these actions will encourage ORV activities, causing human disturbance and further habitat reductions.

It is stated in Mule and Black-tailed Deer of North America that "...no proven management strategy has been offered that will sustain an economically viable livestock industry on desert range lands without destroying them".

TABLE 4

PROBLEMS AND POTENTIALITIES IN DEER RESTORATION

BURRO DEER HERD UNIT

SEASONAL HABITAT CAPACITY FACTORS

Summer Range		Winter Range	
Factor	*Potential	Factor	Potential
Land Development		Land Development	
Agriculture & Recreation	-20% to 0%	Agriculture	-10% to 0%
Off-Road Vehicles	-10% to 0%	Mining	-15% to 0%
Canal Mortality	-15% to 0%	Energy Resources	-10% to 0%
Habitat Improvement	0% to 10%	Competition	-20% to 10%
Worst Case Total	-45%	Habitat Improvement	0% to 30%
Best Case Total	+10%	Worst Case Total	-55%
		Best Case Total	+40%

*Potential influence on range carrying capacity in response to indicated factor.

Nowhere is this statement more applicable than on the Colorado Desert. Competition from non-native herbivores, whether livestock or wild burros, cannot be tolerated by a deer population whose low numbers and density are functions of range capacity. Over the next 10 years, competition from an unchecked wild burro population could potentially reduce range capacity by 10 percent. If domestic livestock allotments should increase and burro populations do not decrease, losses of as much as 20% could be expected. However, if the BLM continues its program to reduce wild burro numbers and issuance of any further livestock allotments, effects from interspecific competition could be quite minimal.

The BLM's California Desert Conservation Area Plan contains provisions for the maintenance and/or improvement of wildlife habitat. Through implementation of these provisions, much could be done to reduce the threat of ORV impacts on publicly owned deer range. However, mineral and energy resource exploration and development will continue and very likely will increase during the next 10 years. Through the environmental review process, mitigation in water source developments and vegetation enhancement projects could offset impacts to a large degree.

Increased water source distribution appears to be the most effective measure for maintaining or improving conditions for burro deer on their desert range, because it would allow deer greater access to and more sustained utilization of forage on their range. It is not unlikely that a system of adequately distributed permanent water sources would improve winter (desert) range carrying capacity by as much as 30% over the next 10 year (Table 4).

3. Unit Wide Mortality Factors

Listed in Table 5, these factors tend to act directly on herd mortality rather than on habitat capacity. Their estimated impacts are discussed in Section II, A-6, pages 10-14.

Until the effects of predation on burro deer are better understood, no discussion of direct predator control measures will be made. In the sense that predation is density dependent, the effects of increased water source distribution and other habitat improvements, which would tend to reduce localized deer concentrations, would indirectly act to lessen its impacts on the burro deer herd.

TABLE 5

PROBLEMS AND POTENTIALITIES IN DEER RESTORATION

BURRO DEER HERD UNIT

HERD MORTALITY FACTORS

Factor	Potential*
Predation and Other Natural Causes	-20% to -15%
Poaching	- 6% to - 3%
Disease and Parasitism	- 1%
Road Kills	-10% to - 2%
Hunting	- 3%
Worst Case Total	-40%
Best Case Total	-20%

*Potential influence on herd numbers in response to indicated factor

On a similar basis, poaching could also be decreased as deer become less dependent on specific water sources. It is believed that in a "best case" poaching could be reduced 50 percent.

As previously discussed in Section II, road kills have not been considered a serious mortality factor with burro deer. However, in a "worst case" subsequent to extensive removal of riparian habitat in the Riverside subunit, most deer of that area would relocate to the nearby desert washes for forage and cover. They would then have to cross the highway for water. Consequently, these deer will be subjected to a high incidence of road kill mortality. If measures to lessen these impacts are to be effective, they must be intitiated prior to any extensive clearing or preclusion to water access. The most immediate need is for safe access across the highway to water. This can be accomplished by constructing access ways (vehicle overpasses) at key points. Subsequent water source developments in the nearby washes will further reduce the probability of road kills in that area.

Legal harvest is appropriate, and disease and parasitism are presently not considered to be significant mortality factors. Consequently, no measures to reduce these factors are being considered.

IV. PROBLEMS IN MANAGEMENT

1. Extensive blocks of riparian woodland summer range are being cleared for agriculture on Colorado River Indian Tribes land.

2. Mining activities are increasing in the desert winter ranges. Due to the nature of the existing mining laws, these activities could cause serious impacts to deer habitat. Recent improvment in mining technology are resulting in larger mining operations with more surface disturbance and more human activity. Mitigation measures are applied in required plans of operations.

3. Jojoba agriculture is increasing in desert areas. Future developments could reduce critical habitats in key areas of winter range.

4. Off-road vehicles are destroying habitat and disturbing deer on portions of their range.

5. Competition with wild burros is limiting deer use in key areas of summer range along the Colorado River between Palo Verde and Ferguson Lake.

6. On winter range, utilization of forage by burros, and in a fre locations domestic sheep and cattle, can threaten deer with habitat degradation and increased competition for forage.

7. Limited manpower and increased workloads impede efforts to concentrate on deer management activities.

8. Wildlife Protection personnel are limited in deer related activities because of other workload priorities.

9. Funding for wildlife habitat development is limited.

10. Assessment of herd and habitat conditions are difficult because of the low density and wide distribution of the herd.

11. There is a lack of specific information on the deer herd in the following categories: a) herd age class and sex composition; b) effects of predators, and c) illegal kill.

12. Information on deer food habits and forage quality is lacking in the Colorado Desert.

13. Standardized habitat evaluation procedures have not been adopted for use in desert habitats.

14. Concrete lined canals can be a death trap and a barrier for deer.

V. MANAGEMENT PROGRAMS, OBJECTIVES AND RECOMMENDED PRESCRIPTIONS

The following programs, specific objectives and recommended prescriptions are designed to achieve herd plan goals.

1. Inventory and Investigative Element

Objective: To collect and maintain information on a subherd basis to effectively manage the burro deer herd.

Recommended Prescriptions:

1. The following ongoing herd performance indicators should be continued.

   a. Maintain spot kill maps for the entire zone.

   b. Herd condition should be evaluated at least every other year by a helicopter conducted herd composition count in early February. , If a minimum of 16 hours of helicopter time is not available, the count can be made from the ground. A team effort should be used to include Department biologists, wardens and FWS, BLM, and CRIT personnel. Surveys should include the

Riverside Mountains - Lost Lake area, Cibola National Wildlife Refuge - East Chocolate Mountain area and Chuckwalla Mountains.

c. To provide basic harvest information, the age structure of the kill should be monitored for two consecutive hunting seasons at five year intervals.

2. The following additional herd performance indicators are recommended for future management applications.

a. Coordinate with the national wildlife refuges and Colorado River Indian tribes to obtain hunting success information. At minimum, a weekly record should be maintained of the number of hunters and deer taken.

b. Delineate the major deer ranges and indicate migration corridors within each subunit.

c. Conduct surveys with BLM and Desert Wildlife Unlimited to document deer desnity and habitat values in the area of the Salton Wash. This information will be used to evaluate the effects of lining the Coachella Canal.

d. Conduct surveys to determine deer density in representative habitat areas to obtain indices for overall population estimates. This may be accomplished by using the helicopter quadrat census method described by Kufeld et al. (1980).

e. Support investigations to determine deer food habits and relative seasonal forage abudnance and quality.

B. Herd Management and Mortality Control Element

Objective: Reduce all causes of mortality other than legal harvest to offset anticipated losses from habitat reduction.

Recommended Prescriptions

1. Coordinate with Colorado River Indian Tribes and California Department of Transportation (CalTrans) to minimize the high road kill potential in the Riverside subunit. Promote the construction of underpasses and fences to facilitate safe deer access to the Colorado River. In addition, add deer crossing signs where appropriate on U.S. Highway 95 and State Highway 78.

2. Coordinate with BLM to reduce human and ORV disturbance of deer in critical habitats.
3. Evaluate effects of lining canals and recommend measures to prevent deer losses.

C. Habitat Element

Objective: Maintain as much riparian woodland habitat as possible on critical summer ranges. Increase the carrying capacity of the desert uplands through improved water source distribution and vegetation enhancement. Protect all seasonal ranges from further degradation from human activities.

1. The following ongoing habitat prescriptions should be continued.

   a. Continue to monitor land use changes by annual ground and aerial inventories within each subunit to document adverse impacts. List actions to offset negative impacts and the loss of deer habitat.

   b. List, map and update habitat acquisition and land exchange needs. Pursue measures to acquire critical deer habitat for public ownership.

   c. Coordinate with BLM, Colorado River Indian Tribes, Desert Wildlife Unlimited and Palo Verde Rod and Gun Club to develop a herd unit program to improve the water distribution for deer.

d. Document the effectiveness of water source developments by monitoring tracks at the drinkers and pellet counts in the vicinity of the habitat development.

e. Maintain the records within the unit water source books.

f. Coordinate with the Bureau of Reclamation to accomplish the water source and vegetation enhancement commitments for the rock quarry mitigation.

2. The following actions are recommended for future habitat management goals. In a future implementation plan, these actions will be described in a detailed habitat development program.

a. Develop guidelines to maintain deer habitat in the riparian zone and corridors of habitat along natural drainages to the Colorado River. Primarily this is to maintain critical habitat and provide deer access to the River in areas of agricultural expansion.

b. Coordinate with Colorado River Indian Tribes to develop guidelines for maintenance of deer habitat and wildlife management practices compatible with development of the riparian zone in the Riverside and Whipple subunits.

c. Develop a cooperative program to maintain and improve deer habitat within special land use areas, such as Cibola and Imperial National Wildlife Refuges, Picacho State Recreation Area and the Chocolate Mountains military zone.

d. Coordinate with Planning Commissions and Boards of Supervisors to resolve potential conflicts between deer use and private land developments within the deer herd unit.

e. Coordinate with BLM to establish criteria for assessing potential conflicts between deer use and mining and develop guidelines to minimize impacts to deer habitat.

f. Coordinate with BLM to achieve an equitable balance between ORV use and protection of important deer habitats. Roads and jeep trails leading to important deer water sources in the desert should be closed to public vehicular travel. These roads should be blocked where barricades will be effective.

D. Utilization Element

Objective: Maintain a viable deer population in the Riverside, Whipple and Central subunits for future consumptive and non-consumptive use.

Recommended Prescription:

Coordinate annual harvest strategies and assessments with Colorado River Indian Tribes.

Objective: Provide for a minimum sustained annual harvest of 30 legal bucks by maintaining buck levels in proportion to the present relatively high overall herd size in those subunits south of Interstate Highway 10.

Recommended Prescription:

Develop a coordinated program for habitat improvement as discussed in the habitat element. This should counter the anticipated effects of future drought and long-term habitat losses and allow deer within these subunits to maintain their numbers and provide a sustained yield of at least 30 legal bucks.

Objective: Provide for high quality consumptive and non-consumptive use of the burro deer resource.

Recommended Prescriptions:

1. Encourage hunters to hunt during weekdays and after the opening weekend to lessen hunting pressure.

2. Communicate to non-consumptive users the importance of the "closed zone" of the Cibola National Wildlife Refuge as a place to observe or photograph deer.

E. Law Enforcement Element

Objective: Increase the effectiveness of law enforcement activities in reducing the illegal kill in zone D-12.

Recommended Prescriptions:

1. Concentrate patrol activites in areas of higher deer density to lower the illegal kill by arrest or by the presence of a WLP officer. This should also lower harassment of deer by ORV activity.

2. Coordinate patrol efforts between the Imperial Valley and Blythe squads, and include other agencies such as CRIT wardens and BLM desert rangers, depending on the problem area and deer concentrations. This would take place day or night, when possible, and depend on the potential for illegal activity.

3. Schedule night patrols involving aircraft on opening and closing weekends.

4. Arrange stakeouts using starscopes or other special equipment.

5. Conduct more undercover patrols. Switch undercover vehicles around to prevent being identified.

6. Beside CalTIP, look into rewards from county Fish and Game Commissions. Most people do not report violations due to fear and often a monetary reward is necessary for increased incentive.

7. Be sure that DFG phone numbers are available to other agencies along with officers locations.

8. Plan patrols that concentrates on known migration corridors when deer are moving, which will save mileage.

9. Put off-road vehicle containment laws in Fish and Game regulations for use by state peace officers.

F. Communication of Information Element

Objective: Increase public awareness of the status of the burro deer herd, and convey as much specific information as possible concerning the herd to interested publics.

Recommended Prescriptions:

1. Publish and provide a summary of this plan to all interested publics.

2. Seek additional publicity through local public media (radio, television, newspapers, etc.) to provide pertinent information to a wider interest group. In particular, seek such additional publicity when new management procedures are initiated.

3. Provide information to private landowners, miners, and off-road vehicle organizations concerning land management practices which would be of benefit to deer.

4. Provide information, including technical data such as herd composition, necropsy information, canal mortality, etc. to governmental agencies, educational institutions, and private groups interested in the deer resource.

5. An effort should be made to educate the public regarding the role of the two federal refuges encompassing the largest river concentration of burro deer.

G. Review and Update

Objective: Provide an annual review and update of the herd plan.

Recommended Prescriptions:

1. Coordinate with BLM, Colorado River Indian Tribes, USFWS, USBR, CDPR, interested sportsmen's clubs and landowners to meet annually for a review and discussion of herd plan accomplishments and forthcoming annual objectives.

2. Provide an annual status report of herd conditions, habitat gains and losses and research conducted during the year. This report should be distributed to all plan holders and interested publics.

VI. ALTERNATIVES

A. No Habitat Improvement and No Herd Management

This alternative would discontinue all current and future programs to manage burro deer. No attempts would be made to decrease the illegal kill or determine the effects of other mortality factors. Watersource distribution would remain inadequate and habitat losses would continue without compensation. In response, deer numbers would show a continual long-term decline, with drastic losses occurring during drought periods.

This alternative was not selected for the following reasons:

1. It does not comply with Legislative Mandate AB 152 and the Department's commitment to maintain and enhance deer populations in California.

2. It would not provide for high quality diversified use of the deer resource as expressed in the statewide deer plan.

3. No new biological information on burro deer would be obtained and all former efforts to this end would be wasted.

B. Managing for Trophy Bucks

This alternative would require that legal harvest restrictions be increased to one buck, three points or better. The rationale for this consideration was that burro deer bucks have a tendency to develop large, well-formed antlers within three or four years of age. The restrictions would increase the survivorship of the yearling and two-year age classes and thus provide hunters with a greater opportunity to harvest a trophy buck.

This alternative was not selected for the following reasons:

1. Trophy bucks occur in sufficient numbers so that no special program is needed for those who wish to hunt them.

2. A trophy hunt program would be biased against a majority of hunters who favor the present system.

C. Manage for Maximum Feasible Habitat Productivity and Maximum Sustained Yield of Deer

This alternative would require that deer receive first priority over all other wildlife species and land uses. Habitat capacity would have to be increased many times beyond its present level on both summer and winter ranges. To minimize mortality, an intensive predator control program would be necessary and Wildlife Protection personnel would have to focus their activities towards eliminating the illegal kill. These measures would be needed to increase the herd size and allow for a maximum sustained yield. A substantial increase in the herd size would require an intensive utilization program involving the harvest of both sexes.

This alternative was not selected for the following reasons:

1. It is highly unlikely that all agricultural, recreational and resource devleopments on burro deer range are going to cease in the foreseeable future.

2. The current state of knowledge for manipulating desert habitats to higher levels of productivity is very limited.

3. Studies suggest that because of low range productivity, herd growth in southwestern deer populations is slow and requires relatively long periods to approach carrying capacity. "Heavy harvest, particularly of antlerless deer, may depress a herd for several years rather than stimulate any increased reproductive response" (Short 1979).

4. The expenses and manpower required for intensive habitat improvement and predator control programs are not available.

THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
1701 NIMBUS ROAD, SUITE D
RANCHO CORDOVA, CA 95670
(916) 355-0124

LABORATORY REPORT

July 22, 1983

No._____ Date Received Varied

Collector Bob Celentano

Address P.O. Box B.D.
Blythe, CA 92226

Animal Burro mule deer

Remarks These samples were taken at various times between March 1980 and April 1981 in Imperial and Riverside counties subsequent to radio-collaring

Specimen Serum samples (8)

RESULTS OF EXAMINATION

ANALYSIS:
Bluetongue (BT) virus antibodies were present in 88% (7 of 8) of animals tested, indicating infection is quite widespread and common. No BT virus was isolated from any of six samples submitted. Although sample size is small and non-random, it seems likely that winter gnat activity results in transmission of BT between deer and perhaps between livestock and deer. Its effect on fawn survival is unknown.

Antibodies against other common livestock diseases, including: brucellosis, anaplasmosis, leptospirosis, IBR, BVD, and PI-3 were absent, or found at such low titers or in so few animals that no case for concern can be made. Whole blood selenium levels on these animals showed a mean of .312 ppm. This is quite adequate and may indicate that selenium deficiency is not a likely problem. As indicated previously, small sample size should limit our confidence in these results.

DAJ/sr

Enclosure

WILDLIFE INVESTIGATIONS LABORATORY
WILDLIFE MANAGEMENT BRANCH

David A. Jessup DVM

By David A. Jesup, DVM, Staff W/L Pathologist

Appendix 1

Burro Deer - Disease and Parasites

1980

Area	Tag No.	Date	Age	Sex	B.T.	Bru.	IBR	BVD	Ana	Lep	P.I.^{3}
Palo Verde Mts.	5195	3-11	4+	F	+/-	-	4	4	-	-	
Riverside Mts.	5326	3-10	3	F	+/-	-	-	4	-	-	
Chuckwalla Mts.	5330	5-23	Ad.	F	0	-	2	-	-	-	-
Ferguson Lake	5328	5-22	Ad.	F	0	-	2	-	-	-	-
Palo Verde		3-5	Ad.	M	-/-	-	-	-	-	-	-
Ferguson Lake	5334	4-17	1	F	+/-	-	-	-	-	-	-/32
Chuckwalla Mts.	5335	4-15	2	F	+/-	-	-	256	-	-	-
Ferguson Lake	5337	4-17	1	F	+/-	-	-	64	-	-	-

B.T. Blue Tongue

Bru. Brucellosis

IBR Infectious bovine rhinotracheitis

BVD Bovine virus diarrhea

Ana Anaplasmois

Lep Leptosperosis

P.I.^{3} Para influenza-3

APPENDIX II

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF FISH AND GAME
Golden Shore
Long Beach, CA 90802
(213) 590-5113

October 14, 1980

Fellow Deer Hunters:

We are now studying the Burro Mule Deer which live in Zone D-12. All Zone D-12 applicants are being asked to provide us with important information concerning their deer hunting activities in this area. The information that you provide is very important and we cannot overstress the need for your full cooperation.

The information from your questionnaire will be evaluated with information received from others. This information will help determine hunter use and success in Zone D-12, provide biological data regarding age class and sex ratios of Burro Mule Deer, and aid in the formulation of a management plan.

With this in mind, please fill out the attached questionnaire as carefully and completely as possible. If you cannot remember exact figures, please provide your best estimate.

Enclosed with the questionnaire is a small envelope. Please carry the envelope with your deer tag. If you kill a buck, follow the instructions for removing the teeth and return the teeth along with the questionnaire.

This form is for you as an individual, so please do not consider the success or observations made by your friends or other members of your or other hunting parties. Your information will be held entirely confidential. Your cooperation is appreciated in providing essential information for management of the burro deer population.

Thank you for helping us manage California's wildlife resources.

Sincerely,

Fred A. Worthley Jr.
Regional Manager
Region 5

Attachments

QUESTIONNAIRE - ZONE D-12

1. Your name and address_____.

2. Where did you hunt deer in Zone D-12?

   County: San Bernardino, Riverside, Imperial. (circle) any and all you hunted.

   Mountain Range:_____(fill in)

   Wash System:_____(fill in)

   Other Location:_____(fill in)

3. How many days did you hunt: 0 1 2 3 4 5 6 7 8 9 10 11 or more (circle)

4. How many hours of hunting per day did you average? 0 1 2 3 4 5 6 7 8 9 10+ (circle)

5. Did you kill a buck: YES NO (Circle)

6. If you killed a buck:

   a. Where was the buck taken?

      County: San Bernardino, Riverside, Imperial (circle)

      Mountain Range:_____(fill in)

      Wash Sytem:_____(fill in)

      Other Location:_____(fill in)

   b. Number of points on: Right antler_____. Left antler_____.

7. Please estimate the total numbers of each sex and age class of deer that you observed while hunting in Zone D-12:

   a. Adult males_____.

   b. Adult females_____.

   c. Yearlings_____.

   d. Fawns_____.

8. How do you feel about the present deer season in Zone D-12 with regard to:

   a. Dates of season: to early, a little early, just right, a little late, too late

   b. Length of season: to short, a little short, just right, a little long, too long

Please return this Questionnaire along with the attached "Tooth Envelope" in the enclosed prepaid, self-addressed envelope. Thank you

HOW TO REMOVE A DEER TOOTH

As an aid in classifying the age of bucks taken, we are asking successful hunters to remove two incisors (front teeth) from the mouth of the deer.

We would like to have the two teeth closest to the center of the mouth, in front of the tongue. To remove them, cut with a pocket knife as deep as possible into the gum on both sides of each tooth, then with pliers, twist and remove each tooth with root intact. Be careful not to crush the tooth, and wash off any dirt or grit.

Place the two teeth in the small envelope and return them with the completed Questionnaire.

Thank you

State of California APPENDIX III

Memorandum

To : Bonnar Blong
Associate Wildlife Biologist

Date: September 9, 1982

From : Department of Fish and Game Bob Celentano
Upper Colorado River Unit

Subject: Sand dune pocket habitat inventory at windmill ED 6

There are three vegetative associations in the vicinity of the pocket : 1) sand dune vegetation, 2) honey mesquite and desert willow associated within the pocket, 3) Palo Verde and creosote just north of the pocket. Beyond the third association to the north is a broad area of creosote and burro bush.

A toe-point and three pellet transects were conducted within the honey mesquite-desert willow association. These transects start at the windmill on a bearing of 175 degrees east and extend across the pocket, (see attached map). Sample size for the toe-point transect was 561 points. Each pellet transect consisted of a belt six feet wide and 11 chains long. No pellet groups less than six months old were counted, but 12 older pellet groups were within the plots.

Apparently most of the deer left the pocket area following the heavy rains in late July and early August. Few deer are now in the area. Two sets of deer tracks crossed the transect lines. Over all deer use of the area for this summer appears to be light. This is probably due to the frequent rain storms that occurred this summer. The opportunity to evaluate fawning habitat was not good. It is difficult to observe deer in this habitat. No burro or livestock sign was observed.

Desert buckwheat (Eriogonum deserticola) which is confined to the dunes had been used by deer. Honey mesquite showed signs of browsing. This was most obvious on mesquite trees that were isolated and not large, though mature. Most of the mesquite was large and tree like, being 14 to 16 feet high and 25 feet wide. A definite high-line effect, about jackrabbit height, showed on the large mesquite trees. Twigs were cut or had been clipped in rodent fashion within the high-line space. There were packrat nests under most of the mesquite trees that were large and wide. Coyote droppings were full of mesquite beans. Some of the Baccharis exhibited heavy rodent use and light browsing by deer. Grass and weeds were generally lacking within the pocket, though galleta grass occurred near the dunes. Large patches of green annual grass and weeds were located in the Palo Verde-creosote association situated just north of the pocket. A few deer tracks were observed in these green patches.

A high number of mourning doves and whitewings were in the pocket. Desert quail were also numerous. Sixteen doves of both species drank at the overflow pipe

while we were at the windmill. Coyote sign was abundant. This is a productive wildlife area.

The well has been operating for four months and is functioning properly.

One party of hunters had driven to the well and shot doves. They did not pluck their birds at this site. Six boxes of shells were expended and these and the shells were left about 30 feet from the drinker. This acrivity could have an effect on the deer use of the area.

Robert R. Celentano

Robert R. Celentano
Wildlife Biologist

cc: Garcia
Blythe office files

APPENDIX IV

HABITAT TYPES AND COMMON PLANTS

BURRO DEER WINTER/INTERMEDIATE RANGES

A. Habitat Type (Ref. CNDDB 1983, modified from Cheatham and Haller 1975)

Sonoran Desert Scrub
Alluvial Woodland
Joshua Tree Woodland

B. Common Plants

Trees

Ironwood *(Olneya tesota)**
Palo Verde *(Cercidium spp.)**
Desert Willow *(Chilopsis linearis)**

Shrubs

Smoke Tree *(Dalea spinosa)*
Catclaw *(Acacia greggii)**
Ocotillo *(Fouquieria splendens)**
Creosote Bush *(Larrea divaricata)*
Brittle Bush *(Encelia farinosa)*
False Mesquite *(Calliandra eriophylla)**
Joint Fir *(Ephedra spp.)**
Desert Fir *(Peucephyllum schottii)*
Bur Sage *(Ambrosia dumosa)*
Cheesebush *(Hymenoclea salsola)*
Thornbush *(Lycium spp.)*
Jojoba *(Simmondsia chinensis)**
Goldenbush *(Hoplopappus spp.)*
Sweetbush *(Bebbia juncea)**
Ratany *(Krameria spp.)**
Desert-Lavender *(Hyptis emoryi)*
Cholla *(Opuntia spp.)**
Milkweed *(Asclepias spp.)**

Forbs and Grasses

Desert Straw *(Stephanomeria spp.)**
Buckwheat *(Eriogonum spp.)**
Plantain *(Plantago spp.)**
Fiddleneck *(Amsinckia spp.)*
Forget-me-not *(Cryptantha spp.)*
Brandegea *(Brandegea bigelovii)**
Mistletoe *(Phoradendron californicum)**
Rigid Spiny Herb *(Chorizanthe rigida)*
Ditaxis *(Ditaxis spp.)**
Sand Mat *(Euphorbia spp.)**

Rock Pea, Deer Weed *(Lotus spp.)**
Lupine *(Lupinus spp.)*
Mallow *(Sphaeralcea spp.)*
(Malvastrum spp.)
Primrose *(Oenothera spp.)*
Gilia *(Gilia spp.)*
Phacelia *(Phacelia spp.)*
Desert Tobacco *(Nicotiniana trigonophylla)*
Brickellia *(Brickellia spp.)*
Emory Rock Daisy *(Perityle emoryi)*
Big Galleta Grass *(Hilaria rigida)**
Three Awn Grass *(Aristida spp.)*
Grama Grass *(Bouteloua spp.)**
Brome Grass *(Bromus spp.)*
Salt Grass *(Distichlis spicata)*
Squirreltail Grass *(Sitanion hystrix)*
Schismus Grass *(Schismus spp.)*
Panic Grass *(Panicum spp.)*
Needlegrass *(Stipa spp.)*

* Known forage species

APPENDIX V

HABITAT TYPES AND COMMON PLANTS

BURRO DEER SUMMER RANGE

A. Habitat Type

Riparian Forest
Alluvial and Riparian Scrub
Alluvial Woodland
Desert Dunes

B. Common Plants

Trees

Cottonwood (*Populus fremontii*)
Willow (*Salix goddingii*)*
Screwbean Mesquite (*Prosopis pubescens*)*
Honey Mesquite (*Prosopis velutina*)*
Salt Cedar (*Tamarix chinensis*)
Desert Willow (*Chilopsis linearis*)*
Palo Verde (*Cercidium spp.*)*

Shrubs

Seep Willow (*Baccharis glutinosa*)*
Arroweed (*Tessaria sericia*)
Inkweed (*Suaeda Torreyana*)
Saltbush (*Atriplex sp.*)*
Creosote Bush (*Larrea divaricata*)
Bursage (*Ambrosia dumosa*)
Colorado River Hemp (*Sesbania macrocarpa*)
Thornbush (*Lycium spp.*)

Forbs and Grasses

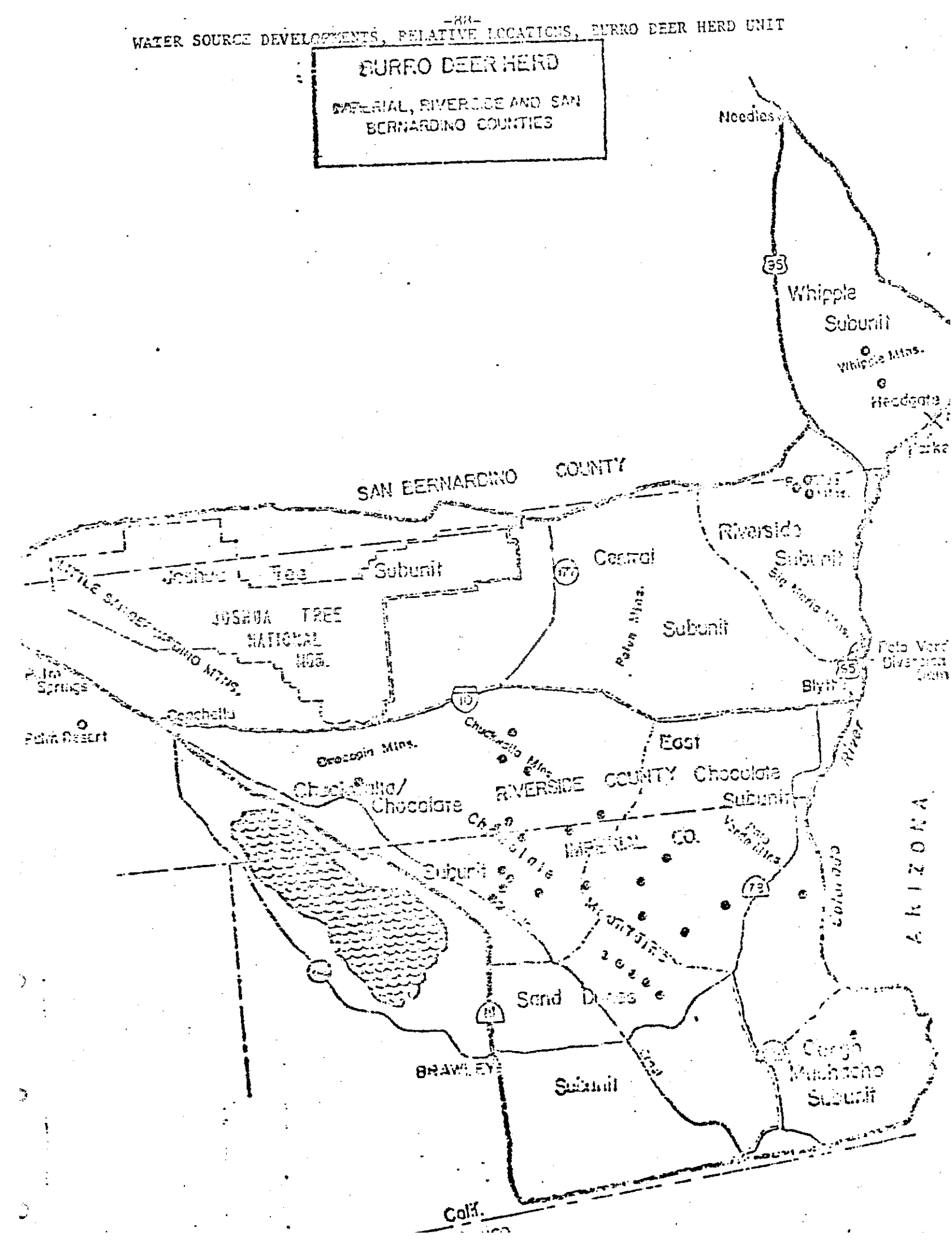
Cat-Tail (*Typha sp.*)
Bulrush (*Scirpus sp.*)
Sedge (*Carex spp.*)
Bacopa (*Bacopa sp.*)*
Heliotrope (*Heliotropium spp.*)
Plantain (*Plantago spp.*)
Jimson Weed (*Datura spp.*)
Desert Chickory (*Rafinesquia sp.*)
Desert Dandelion (*Malacothrix sp.*)
Sheep Sorel (*Rumex spp.*)*
Smartweed (*Polygonum spp.*)*
Buckwheat (*Eriogonum spp.*)*
Goosefoot (*Chenopodium spp.*)
Mistletoe (*Phoradendron californicum*)*
Sand Mat, Spurge (*Euphorbia spp.*)*
Chinch-Weed (*Pectis papposa*)

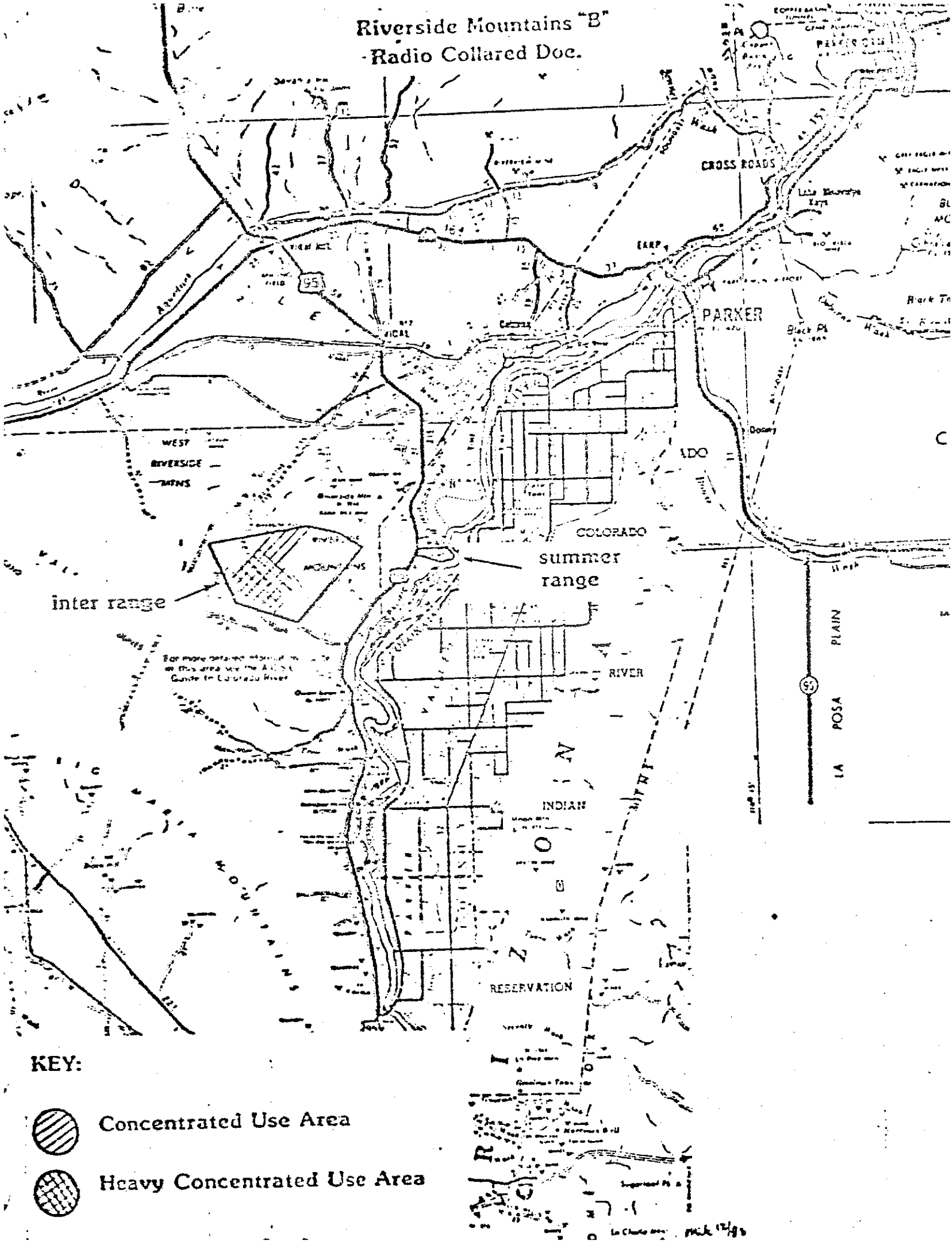
APPENDIX V

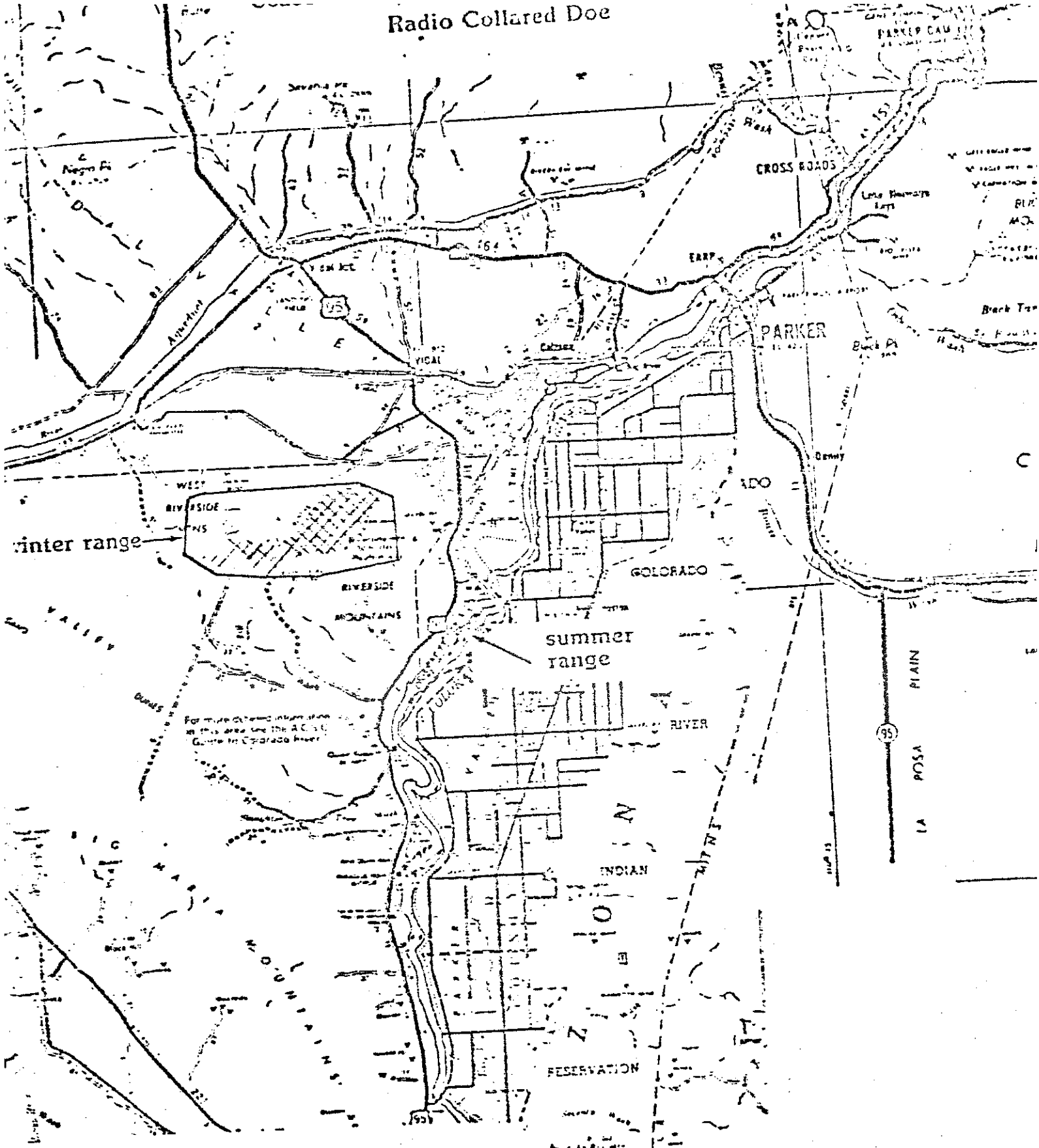
Sweet Clover *(Melilotus indicus)**
Alfalfa *(Medicago sativa)**
Bermuda Grass *(Cynodon dactylon)*
Salt Grass *(Distichlis stricta)*
Needlegrass *(Stipa sp.)*
Sand Bur *(Cenchrus sp.)*
Sand Dropseed *(Sporobolus crystandrus)*
Six Weeks Grama *(Boutelova barbata)**
Three Awn Grass *(Aristida sp.)*
Wild Oats *(Avena fatua)*
Wheat *(Triticum aestivum)*
Barnyard Grass *(Echinochloa muricata)*
Johnson Grass *(Sorghum halepense)*
Carrizo Cane, Reed *(Phragmites communis)*

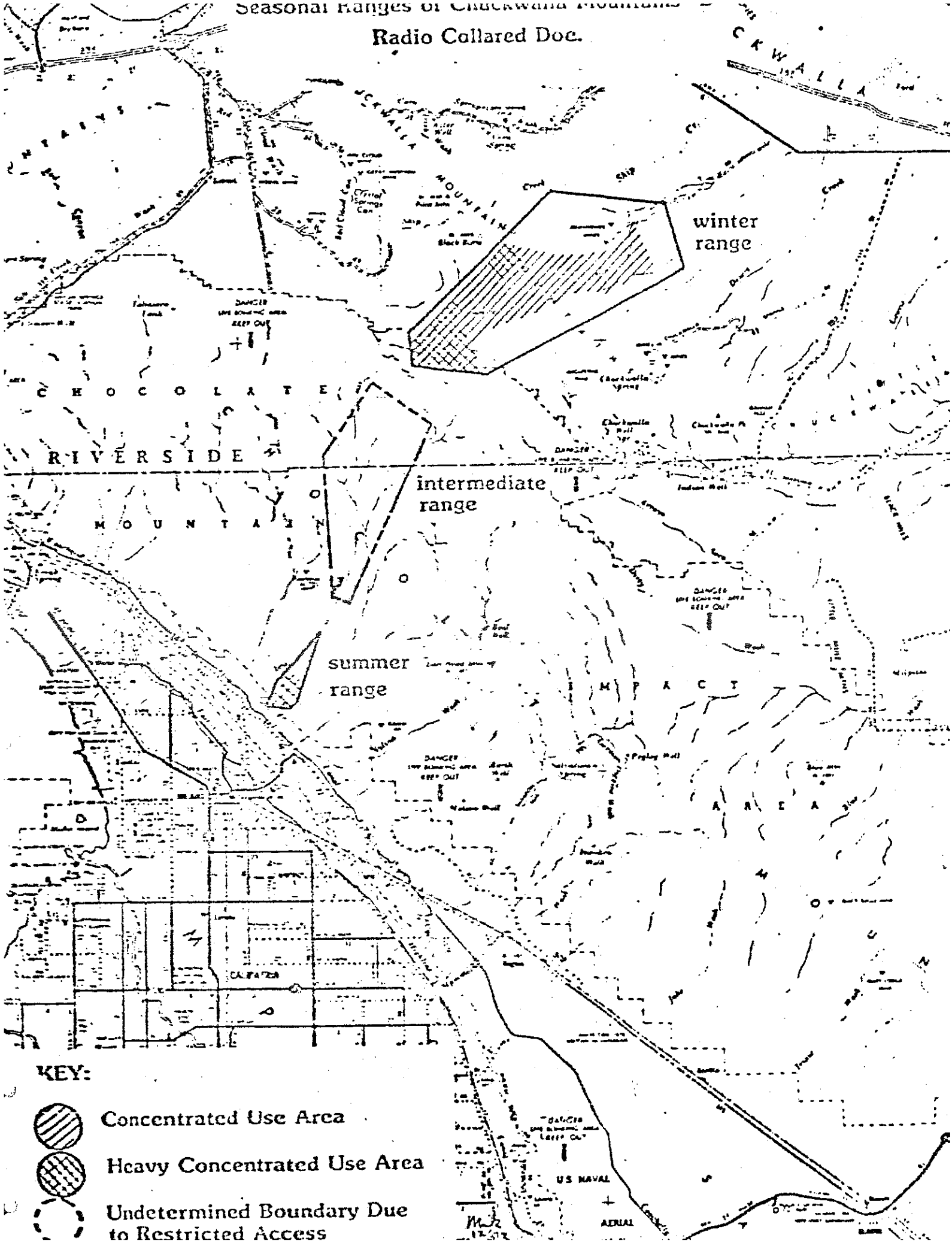
*Known forage species

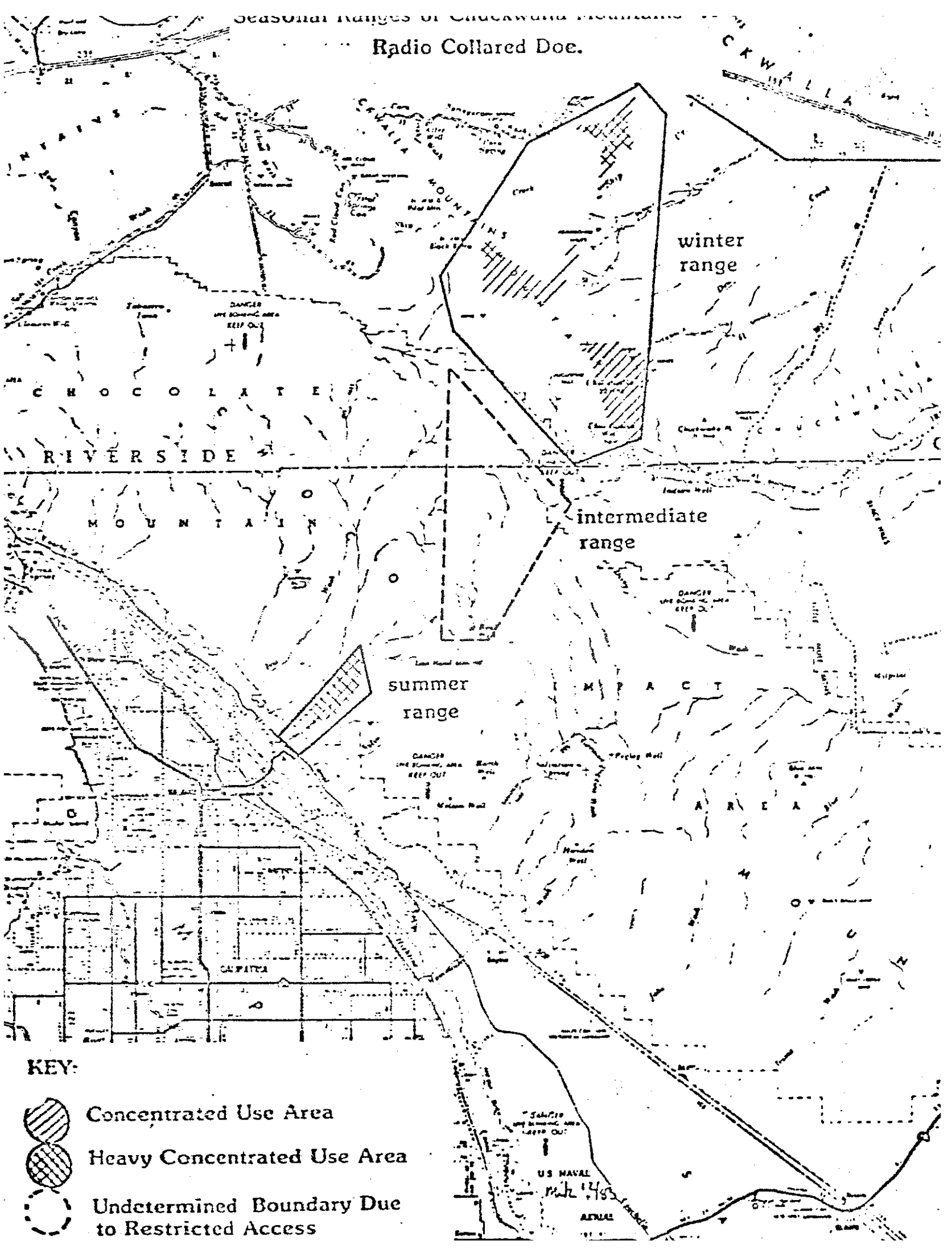
WATER SOURCE DEVELOPMENTS, RELATIVE LOCATIONS, BURRO DEER HERD UNIT

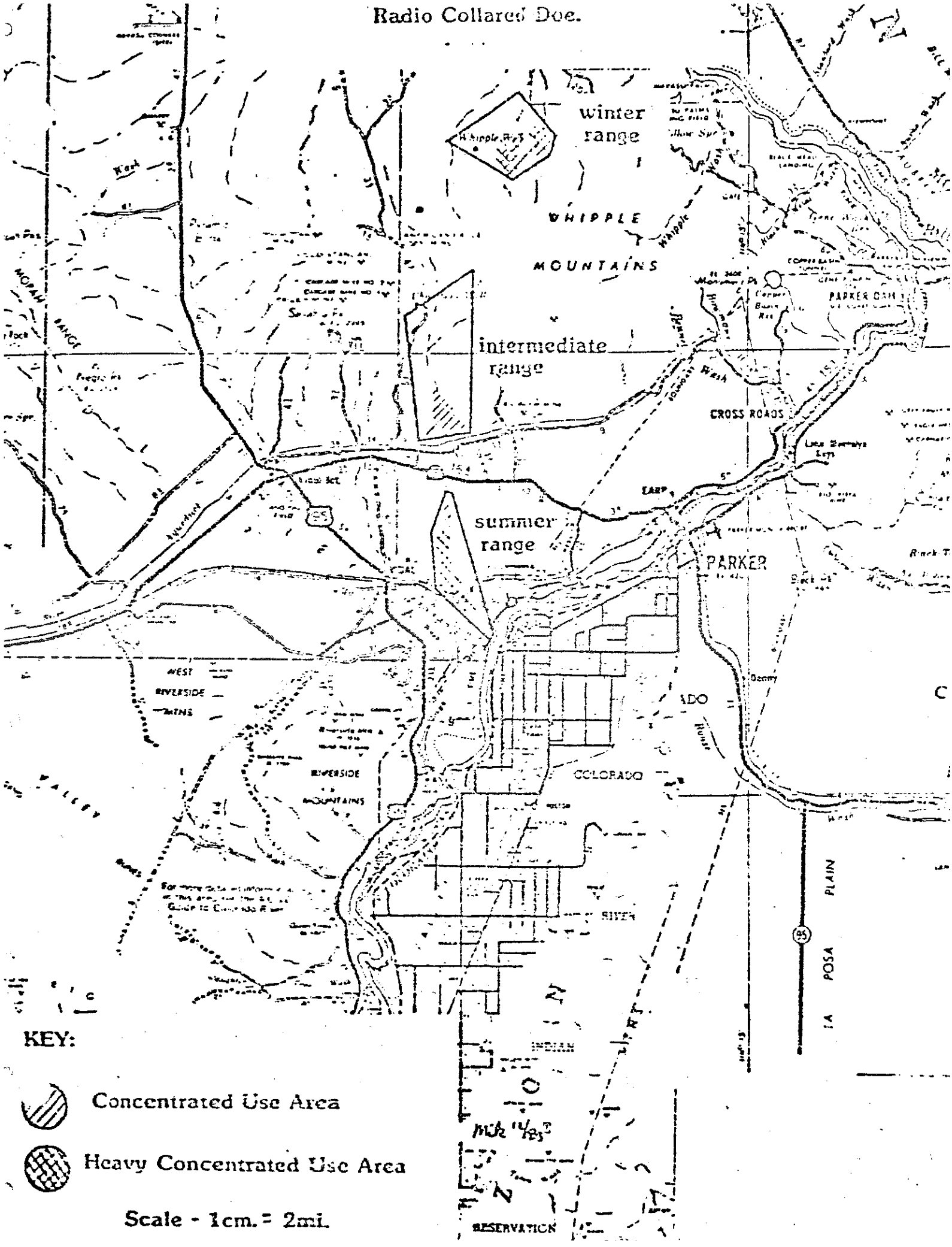



Riverside Mountains "B"
-Radio Collared Doe.
CROSS ROADS
PARKER
WEST
RIVERSIDE
MTNS
COLORADO
RIVER
summer
range
inter range
INDIAN
RESERVATION
PLAIN
LA POSA
KEY:
Concentrated Use Area
Heavy Concentrated Use Area

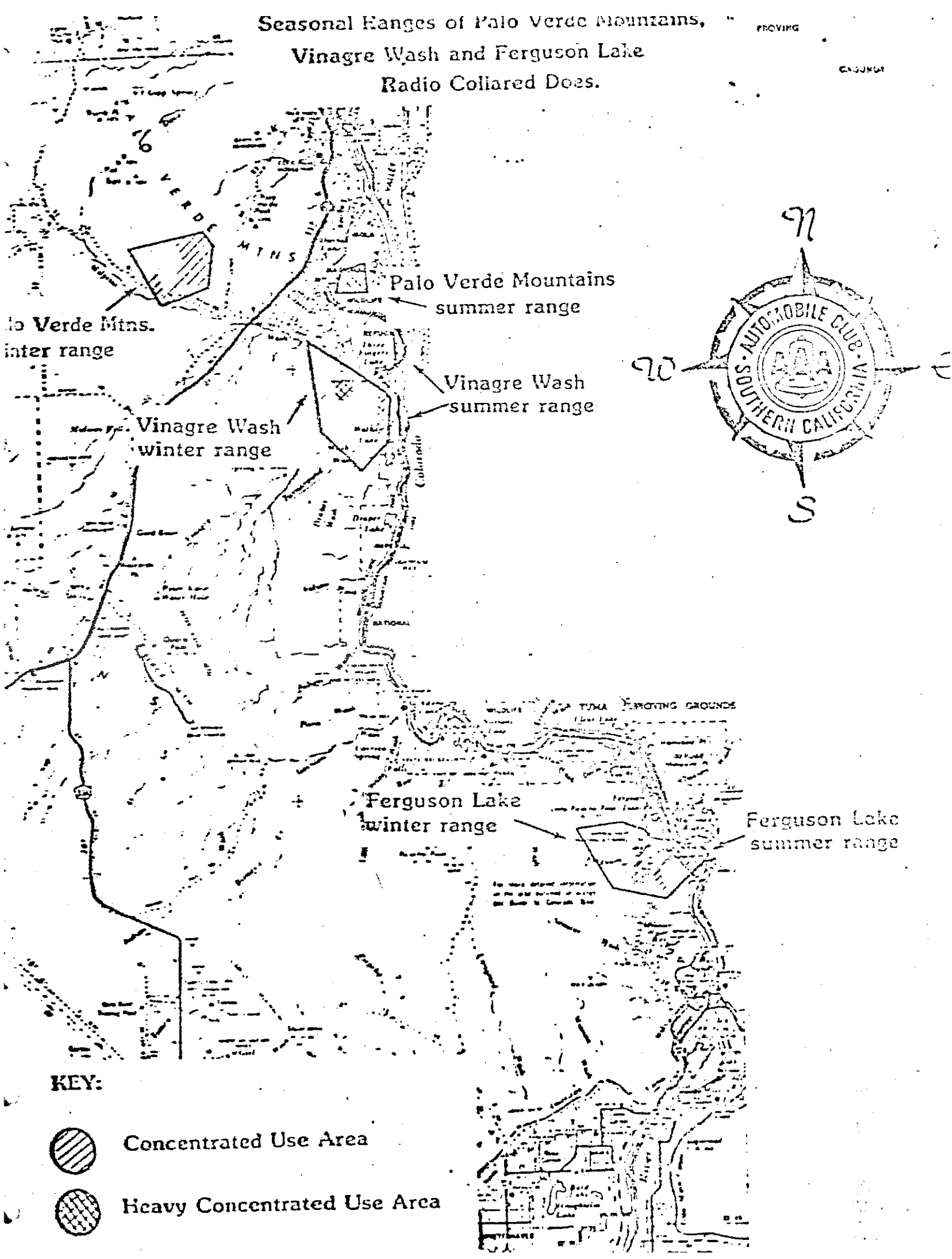

Radio Collared Doe
CROSS ROADS
PARKER
winter range
summer range
RIVER
INDIAN
RESERVATION
KEY:
Concentrated Use Area
Heavy Concentrated Use Area


Seasonal Ranges of Chuckawalla Mountains
Radio Collared Doc.
winter range
intermediate range
summer range
KEY:
Concentrated Use Area
Heavy Concentrated Use Area
Undetermined Boundary Due to Restricted Access


Seasonal Ranges of Chuckwalla Mountains
Radio Collared Doe.
winter range
intermediate range
summer range
CHOCOLATE
RIVERSIDE
MOUNTAIN
IMPACT
AREA
CHUCKWALLA
MOUNTAINS
US NAVAL
KEY:
Concentrated Use Area
Heavy Concentrated Use Area
Undetermined Boundary Due to Restricted Access


Radio Collared Doe.
winter range
WHIPPLE MOUNTAINS
intermediate range
summer range
CROSS ROADS
PARKER
COLORADO
RIVERSIDE MOUNTAINS
WEST RIVERSIDE MTNS
PARKER DAM
POSA PLAIN
INDIAN RESERVATION
KEY:
Concentrated Use Area
Heavy Concentrated Use Area
Scale - 1cm. = 2mi.

Seasonal Ranges of Palo Verde Mountains, Vinagre Wash and Ferguson Lake Radio Collared Does.



APPENDIX XII

WATER SOURCE DEVELOPMENTS

BURRO DEER HERD UNIT

Name	Location
Hava-super BGG	Whipple Mountains
Shangri-La BGG	" "
Celo Tank BGG	Riverside Mountains
Anthes Tank BGG	" "
Owl's Roost BGG	" "
Orocopia BGG	Orocopia Mountains
Chuckwalla Windmill	Chuckwalla Mountains
Ship Creek BGG	" "
Spring Tank BGG	" "
Chuckwalla Well	" "
Mesquite Spring	" "
Rainey's Well	" "
Wiley's Well BGG	Little Chuckwalla Mountains
Black Hills BGG	Black Hills
Little Mule BGG	Little Mule Mountains
Cargo Muchacho BGG	Cargo Muchacho Mountains
Arroweed Spring	Vinagre Wash
Beal's Well	Chocolate Mountains
Sheepfall Tank	" "
Marvin's Tank	" "
Gnat Well	" "
Mulberry Spring Well	" "
Rattlesnake Well	" "
Lost Nuggest Tank	" "
Polish Spring Well	" "
Lunch Box BGG	" "
Bill's Folley BGG	" "
Imperial Gables Well	" "
Coachella Canal Wells (2)	Coachella Canal
Dune Pocket Wells (6)	Algodones Dunes

State of California

The Resources Agency

Memorandum

To : Wildlife Management Supervisor, Region 5

Date : June 2, 1986

From : Department of Fish and Game —Upper Colorado River Unit Manager

Subject: Burro Deer Herd Plan Update

During the 1985 calendar year, the two wildlife unit manager positions that encompass the burro deer herd area were vacant for a considerable time. Pellet transects were read and cleared six times on five big game guzzlers and three new lunchbox style guzzlers were installed.

I. Pellet transects were read and cleared at the Wiley Well, Chuckwalla, Black Hills, Little Mule, and Cargo Muchacho Big Game Guzzlers. Results indicate no change over previous years counts with most use occurring during Spring and early Summer.

Most of the big game guzzlers listed above are old construction techniques that tend to dry up through use and evaporation during the critical summer months. Members of the Desert Wildlife Unlimited (DWU) believe that by making these water sources more permanent that some deer become resident and do not migrate to the river riparian or canal areas. They have completed two of these projects and have plans for others.

II. During 1985, three additional guzzler installations were completed. These include:

1. Little Mules (lunchbox) - T10S R18E Sect. 17 (SESE)
   1,000 gallons storage

2. Cargo Muchacho (lunchbox) - T14S R20E Sect. 13 (SWSW)
   9,000 gallons storage

3. Mulvation (lunchbox) - 6 mi. south of Little Mules BGG
   20,000 gallons storage

III. No changes recommended to deer herd plan, goals, objectives, or management strategies at this time.

Andy Pauli

Andy Pauli
Wildlife Biologist

AP:lp

cc: Bleich, Hein

State of California

DAVIS
The Resources Age

Memorandum

To : Wildlife Management Supervisor, Region 5

Date : September 22, 1987

From : **Department of Fish and Game** --Upper Colorado River Unit Manager

Subject: Burro Deer Plan Update

During 1986, no biological sampling was conducted in the Upper Colorado River Unit portion of the D-12 deer hunt zone. One adit was constructed and a series of check dams installed in the Hills Ranch area of the Big Maria Mountains to benefit deer.

I. Biological Information

A. Harvest

	1985	1986
D-12	26	46
N. of Interstate 10	2	6

II. Habitat Improvement Projects

One adit was constructed in the Hills Ranch area of the Big Maria Mountains using Bureau of Reclamation monies as mitigation for quarrying activities along the River. It has been shown that deer will summer in some desert mountain ranges if dependable water is available. Insufficient precipitation this year has caused this installation to remain inoperable.

A series of four check dams was constructed in an adjacent area using the same funding sources. The purpose is to temporarily hold runoff, deposit additional soil, and increase both number and diversity of cover and forage elements.

III. Other changes to the Burro Deer Plan

None recommended at this time.

Andy Pauli
Wildlife Biologist

cc: Bleich, Davis

AP:lp

1989 Deer Herd Management Plan Update

Deer Herd: Burro Deer Herd - D12 Zone
County: Imperial, Riverside and San Bernardino Counties

A. Description of the Deer Herd Management Unit

1. Herd Condition:

The wide distribution and low density of the burro deer herd, in conjunction with a tendency to remain under cover, make attempts to quantify herd parameters such as population size and composition difficult and costly. Therefore, discussions of herd condition are primarily based on general observations and referred to in relative terms.

Reference: Celantano and Garcia, 1984

Overall, the burro deer herd is in good condition.

a. Individual animal condition:

An average of 38 deer/year have been harvested over the past five years. Due to the large area occupied by the burro deer and the relatively few deer taken attempts to collect data on individual animal condition during the regular hunting season have not been discussed. Alternate sources of this information have not been pursued as road and train kills are infrequent and distribution and sparse density make significant collection efforts impractical. No data on individual condition is currently available. However, field observations suggest that generally animals are in good condition.

Reference: State of California, 1989

Thompson, 1989a

b. Herd health

No data (ie. herd composition, fawn survival, etc.) is currently available regarding herd health.

2. Population Size:

Historical reports suggest a burro deer population size of approximately 2000 animals in 1952. In 1984 the population was considered to be high due to favorable climatic conditions. Current field observations indicate that for the past three years the burro deer population has remained high. This observation is based on deer sightings, although as stated above no censuses have been conducted, as well as deer sign obeserved.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

3. Herd Statistics:

Year	Harvest Bucks	Harvest Antlerless*	Fall Bucks	Fall Fawns	Spring Fawns
1984	44	0	No Data Available		
1985	26	0	"	"	"
1986	46	0	"	"	"
1987	35	0	"	"	"
1988	39	0	"	"	"

* No antlerless hunts have been conducted or proposed within the D12 zone.

Reference: State of California, 1989

4. Deer Hunting

a. Past and current hunting strategies' effects on:

1. deer numbers:

As no accurate population size estimate is available, estimates of hunting strategy impact on the herd as a whole are not currently quantifiable. However, historical estimates of 2000 animals in conjunction with current observations suggesting the population is at high levels and may be well above that 2000 mark indicate that hunter harvests of an average of 38 bucks/year over the past five years would not have significantly impacted the population. Note that hunter harvest has increased significantly in recent years from a five year average of 19.1 bucks/year from 1977-1982 to the present average noted above. This recent increase in hunter take may have resulted from high population levels but may also reflect increased access to desert areas and increasing hunter pressure resulting from urban growth in Southern California.

2. herd composition:

Again, no data is available regarding herd composition. However, the very low percentage of bucks taken, in comparison to estimated herd size, during the D12 hunt is considered to have little impact on herd composition. This observation is further supported by incisor age analysis of samples taken from harvested bucks. This analysis does not suggest an inordinate harvest of a particular age class or subsequent harvest impact on composition.

3. herd health

No data is available regarding herd health in relation to the effects of past and current hunting strategies. Except to reiterate observations of the apparent good condition of the herd in light of those strategies.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

b. Future and proposed hunting strategies' effects on:

No changes in hunting strategies are planned for the D12 zone. It is assumed that current trends with regard to hunting and herd numbers,composition and health will continue.

5. Illegal Harvest

Although no hard data was available, 1984 estimates suggested an illegal harvest level 100% higher than the legal harvest. Currently no additional data is available to suggest a change in this estimated loss.

6. Other

Losses associated with road kills, train strikes and canal drownings continue to be realized. Road kills and train strikes are infrequent and do not likely impact the herd as a whole significantly. Canal drownings have impacted the herd in the vicinity of the Coachella Canal significantly in the past. These drownings have tapered off in recent years and canal lining modifications designed to eliminate deer drownings have been evaluated and will be included in future canal lining projects.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

Thompson, 1989b

B. Non-human Effects on Deer

1. Weather

a. drought

Average precipitation for Imperial County, in which the large majority of burro deer are located was 22% above normal for 1986-1988. This increase equates to .51 inches over the thirty year average of 2.35 inches. In this arid habitat such increases in precipitation are not generally realized on an other than local level. However, deer are observed traveling long distances in search of areas of local precipitation and

subsequent increased forage production and may take advantage of an overall increase in precipitation. This ability to utilize overall increases in precipitation may be a factor in the apparent high population numbers observed in recent years. The current precipitation total for 1989 is .46 inches suggesting that 1989 may be a drought year in this area. As an arid habitat inhabitant burro deer are known to alter behavior patterns in response to drought conditions and will likely remain closer to the Colorado River, Coachella Canal and other more permanent water sources during any future dry periods. Extended drought periods will likely be reflected in reduced herd productivity.

b. early storms

Response of burro deer to precipitation is generally rapid and in the case of localized summer thundershowers results in movement toward areas of precipitation and increased forge production. The more generalized dispersal of winter storms results in a less focused dispersal pattern. In general, any measurable precipitation will elicit a response by burro deer on at least a local level. Precipitation occurring prior to fawning, August - September, may benefit fawn survival.

c. mild winters

Winters are generally mild in Imperial County and not considered limiting to burro deer. Mild summers are certainly less stressful to deer. The current high population levels may also have resulted, at least partially, from mild summers experienced during the few years prior to 1989.

2. Predators

A small number of mountain lions occur within the burro deer range. Sightings of lions are rare and the impact of lion kills on the deer population as a whole is currently unknown. Mountain lion observations have increased in recent years, possibly reflecting high deer population levels. Coyotes occur throughout the burro deer range and may be responsible for a limited number of deer mortalities. No data is available regarding the extent of deer loss to coyotes.

3. Disease and Parasitism

During the 1980 deer capture for a movement, behavior and habitat preference study blood samples were taken from seven deer. Analysis of these samples suggested that deer in the capture areas had been exposed to bluetongue in all cases and bovine viral diarrhea in two cases. No exposure to brucellosis, infectious bovine rhinotracheitis, leptospirosis, anaplasmosis or parainfluenza-3 were detected in those deer sampled. Papillomae have also been observed in burro deer. The impact of disease exposure to burro deer is unknown but thought to be minimal at

this time due to lack of observations to the contrary. Bot-fly larvae, tapeworms and arterial worms have been known to parasitize burro deer.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

Thompson, 1989b

C. Effects of Current Deer Hunting and Proposed Hunting

Currently burro deer hunting strategies include a season of less than one month and quota of 1300 tags of which approximately 1000 are sold annually. This relatively limited hunt in conjunction with the wide distribution of burro deer and resulting dispersal of deer hunters results in minimal impact in any particular area as a result of deer hunting. No changes in these hunting strategies are proposed.

1. Effects Upon Species of Special Concern

a. Changes in local populations

No changes in local populations of species of special concern have been observed or are expected as a result of deer hunting activities.

b. Changes in regional and statewide populations

No changes in regional or statewide populations of species of special concern have been observed or are expected as a result of deer hunting activities.

2. Effects Upon Other Wildlife Species

a. Changes in local populations

No changes in local populations of other wildlife species have been observed or are expected as a result of deer hunting activities.

b. Changes in regional and statewide populations

No changes in regional or statewide populations of other wildlife species have been observed or are expected as a result of deer hunting activities.

c. Changes in health, condition and age class structure of populations

No changes in health, condition or age class structure of other wildlife species have been observed or are expected as a result of deer hunting activities.

d. Changes in mortality factors

No changes in mortality factors affecting other wildlife species have been observed or are expected as a result of deer hunting activities.

3. Changes in Public Use/Recreation

a. Hunting

No changes in the current deer hunting strategy are proposed, hence, no changes in deer hunting public use/recreation are expected beyond more complete utilization of available tags. No changes in other hunting public use/recreation have been observed or are expected as a result of deer hunting activities.

b. Nonconsumptive

No changes in the current nonconsumptive public use/recreation have been observed or are expected as a result of deer hunting activities.

c. Nonhunting

No changes in nonhunting public use/recreation have been observed or are expected as a result of deer hunting activities.

4. Effects Upon Human Populations

No changes regarding effects upon human populations, specifically regarding housing, transportation, public services, energy, human health, aesthetics or cultural resources, have been observed or are expected as a result of deer hunting activities.

D. Range Landownership

An estimated 70% of the burro deer range is publicly owned. A large majority of the remaining private lands are utilized for agriculture. Range landownership and use as it relates to burro deer has not changed significantly since the 1984 burro deer herd plan was completed, except with regard to habitat losses to lands designated for cyanide heap leach mining operations. Losses of habitat to this type of mining can be expected to continue. Urban growth in areas of private landownership can also be expected to continue. This urban growth is not expected to significantly impact deer habitat directly in the near future, however, activities of a growing urban population on adjacent public lands may have an impact on deer utilizing those habitats.

Reference: Celantano and Garcia, 1984

Thompson, 1989b

E. Range Vegetation

Due to mild climatic conditions of recent years burro deer range vegetation has been fairly productive and is likely the prime factor in the relatively high population numbers currently experienced by the deer herd.

1. Fire

Vegetation of Colorado Desert habitats is sparse and wildfires do not generally occur in this area. An exception to this can be seen on the Colorado River were dense stands of riparian vegetation, important summer range for a majority of burro deer, occasionally burn. Since the completion of the 1984 burro deer plan two large fires have occurred along the river. The Goose Flats fire in 1988 burned approximately 200 acres and the Ferguson Lake fire in 1989 burned approximately 800 acres on the California side of the river. Habitat restoration work is underway at Goose Flats, south of Blythe, and currently no habitat restoration is planned for the Ferguson Lake area, north of Winterhaven. No control burns have been pursued within the unit.

Reference: Thompson, 1989b

References

Celantano, R.R. and J.R. Garcia. 1984. The Burro Mule Deer Herd Management Plan. California Department of Fish and Game (CDFG) document.

State of California - Department of Fish and Game. 1989. 1988 Final Deer Take Report. CDFG report.

Thompson, J.R.. 1989a. The Burro Mule Deer Herd Plan Five Year Update and Supplement - Draft. CDFG/Region 5 document.

Thompson, J.R.. 1989b. CEQA Compliance Preparation - Habitat Report, Lower Colorado River Unit. CDFG/Region 5 report.

State of California

The Resources Agency

M E M O R A N D U M

Date: 23 August 1990

To: Larry W. Sitton
Wildlife Management Supervisor, Region 5

From: Department of Fish and Game- Eastern Units Supervis[illegible]

Subject: [illegible] Deer Herd Plan [illegible] Year Update and Supplement

Attached is subject document. Input from past reviews has been incorporated into this version which should be considered the final [illegible]. Please forward this document, through appropriate channels, to the Wildlife Management Division, for final approval, (unless of course such approval should be provided by Region Management; I'm unsure of the proper protocol).

Please see that copies of the final, approved document are distributed to those individuals listed on R. Thompson's memo of [illegible] July [illegible] per R. Thompson's memo of 16 August.

By way of a copy of this memo, I am advising Wildlife Management Division of the completion of this document. I'm sure they will be expecting a copy of it in the near future.

[illegible] C. Bleich
Associate Wildlife Biologist

cc: R. Thompson
[illegible] M[illegible]
K. Mayer

State of California — The Resource Agency

MEMORANDUM

TO: V. Bleich
Field Supervisor

DATE: August 16, 1990

FROM: Department of Fish and Game
Lower Colorado River Unit Manager

SUBJECT: Burro Deer Herd Plan 5 Year Update and Supplement

As stated in the introduction, the Burro Deer Herd Plan 5 Year Update and Supplement has been prepared as an update and supplement to the 1984 D12 deer herd plan, The Burro Deer Herd Management Plan prepared by Robert R. Celentano and Jesus R. Garcia. Included in this report is a summary of herd data from 1984-1989, an evaluation of the 1984 herd plan with regard to past goals and objectives and establishment of goals and objectives for the next five years.

The final draft of the subject document is attached. All comments received have been considered and incorporated as appropriate. The July 6, 1990 memorandum is also attached as a brief summary of the review process to date. Following your review of this draft, please forward it through the proper chain of command. Upon final approval, copies of the document should be sent to the initial reviewing parties (see attached memorandum), in addition any other traditional locations.

Rocky Thompson

Rocky Thompson
Wildlife Biologist

State of California The Resource Agency

MEMORANDUM

TO: Report Reviewers DATE: July 6, 1990

FROM: Department of Fish and Game
Lower Colorado River Unit Manager

SUBJECT: Burro Deer Herd Plan 5 Year Update and Supplement

The Burro Deer Herd Plan Five Year Update and Supplement is attached for your review and comments. As the title suggests this report should be considered as an adjunct to the existing Burro Deer Herd Plan and may require reference to the original plan during your review process.

Limited time and resources may not allow for production of additional copies of this report. So please write out comments and retain this copy for insertion of edited pages at a later date. Comments should be returned directly to me at:

Rt 1 Box 6
Niland, CA 92257
(619)359-0524

It would be appreciated if comments could be returned before July 27. Thank you for your efforts.

Rocky Thompson
Wildlife Biologist

cc: Sitton
Bleich
Mulcahy
Davis
WMD-Sacramento
Brana
Colby
DWU-Lesicka
Imperial Co. F&G Comm.-Rister

Burro Deer Herd

Management Plan

Five Year Update

and

Supplement

July 1990

D12 Herd Plan
Five Year Update
and Supplement

Prepared By: Rocky Thompson
Lower Colorado River
Unit Manager

July 1990

The following report has been prepared as an update and supplement to the 1984 D12 deer herd plan, The Burro Deer Herd Management Plan prepared by Robert R. Celentano and Jesus R. Garcia. Included in this report is a summary of herd data from 1984-1989, an evaluation of the 1984 herd plan with regard to past goals and objectives and establishment of goals and objectives for the next five years. This report presents elements pertaining to herd data, habitat changes, goals, problems in management and management programs, objectives and recommended prescriptions. The herd data element is a summary of 1984-1989 data including harvest, aging and mortality information as well as notes on herd productivity. The habitat changes element includes a summary of habitat improvements, primarily water developments, completed from 1984-1989 and notes regarding habitat improvements evaluated for implementation, including canal lining curbing and siltation damming. The goals element summarizes 1984 herd plan goals achieved and establishes goals for 1990-1994. An evaluation of problems in management perceived in 1984 with projection into the 1990-1994 period is presented in the problems in management element. The final element evaluates management programs, objectives and recommended prescriptions presented in the 1984 herd plan with projection into the 1990-1994 period.

Herd Data

Basic data on the D12 Burro deer herd has not increased significantly since the writing of the 1984 deer herd plan. Additional information on herd demography, distribution, or behavior has not been developed to any large degree. Radiotelemetry research ~~investigating a variety of burro deer behaviors~~ regarding ~~including~~ daily and seasonal movement patterns and habitat preference, was completed immediately following the implementation of the 1984 plan. Data collected during that research is currently unavailable and remains to be consolidated into a useable report. Until ~~further information is developed~~, these data are analyzed rewriting the basic description of the deer herd management unit included in the 1984 plan ~~will be unnecessary~~ is premature

Herd harvest information is collected annually. Table 1 presents a summary of harvest data for the D12 management unit from 1984-1989. Reported take is suspected to be ~~somewhat~~ less than the actual take, possibly on the order of 15-20%. Table 2 presents age data obtained from analysis of incisor teeth of harvested animals. Based on reported kill locations it appears the general distribution of buck harvest presented in the 1984 plan (1984 plan-Figure 5) has remained relatively constant over the past five years.

based on what?

Table 1 - D12 Zone Harvest 1984-1989

Year	Quota	Tag Sales	Harvest	% Success
1984	1300	996	44	4
1985	"	1150	26	2
1986	"	1029	46	4
1987	"	1084	35	3
1988	"	1191	39	3
1989	"	1151	61	5

Table 2 - Age Analysis of Harvested Bucks 1984-1989

Harvest Year	Age Class (# in group/% of annual total) 1	2	3	4	5	6	8	9	14	Sample Total	% of Harvest Sampled
1986	1/9	6/55	2/18	1/9					1/9	11	24
1988		1/17			2/33	1/17	1/17	1/17		6	15
1989	3/43	1/14	1/14			2/29				7	11

Average Age of Harvested Bucks: 1986 - 3.4 (1) 1988 - 5.8 (2) 1989 - 2.9; and ~~1986-1989~~ - 4.0
1986, 1988 and 1989 - 4.0

Note: Friedman 2-Way ANOVA of Table 2 data set concludes no difference between age of kill for ~~1986-1989 period.~~ 1986, 1988, and 1989. — no data for 1987?

Mortality factors, other than legal harvest, affecting burro deer include illegal take, road kills, predation, possibly diseases and/or parasites, and canal drownings as described in the 1984 herd plan. No further data are available regarding illegal take. Illegal take may still be as high as 200% over legal season harvest as reported in 1984. Losses to roadkills appear to be increasing slightly, although complete records in this regard are not available. An average of 15 deer ~~are~~ killed annually between mile markers 12 and 20 north of Blythe on State Highway 95? Ogilby Road from the Cargo Muchacho Mountains north to highway 78 and highway 78 from Goldfields Mine to Walter's Camp Road appear to be dangerous areas for deer crossing. No increased losses due to train strikes are suspected. Although increased losses to predation have not been documented, an increase in mountain lion sightings, particularly in the Chocolate Mountains, has occurred. No additional information is available regarding disease or parasites in the D12 population. However, due to the possibility of disease transmission, goats ~~kept by caretakers at~~ the Salt Creek Wildlife Area were removed following blood and nasal mucous analyses indicating the presence of diseases transmittable to deer and other wildlife species. In accordance with the Decision/Record of Decision of the California Desert Conservation Area Plan (USDI 1980), which calls for the exclusion of grazing south of Interstate Highway 40, in part to reduce the possibility of disease transmission from livestock to wildlife, livestock grazing within the Ford Dry Lake grazing allotment was eliminated south of Interstate Highway 10. This allotment remains intact north of Interstate 10. Action has been initiated to eliminate the Rice Valley grazing allotment; however, it does not appear likely that the allotment will be removed in the near future. The Chemehuevi grazing allotment is the only other allotment within the D12 zone. Canal drownings continue to represent a mortality factor to deer. Table 3 presents a summary of Coachella Canal deer entrapment reported from 1984-1989.

Table 3 - Canal Deer Entrapment 1985-1989

Year	Deer Removed From Coachella Canal		
	Dead	Alive	Total
1985	18	3	21
1986	3	5	8
1987	1	7	8
1988	1		1
1989	5		5

The decline in canal related deer losses in recent years may be attributed to factors discussed in the 1984 herd plan, including alternate water source development, adequate precipitation and relatively mild climatic conditions, or by reduction in numbers of deer ~~utilizing~~ using canal waters.

As stated in the 1984 herd plan, the low density and scattered distribution of the burro deer make it extremely difficult to obtain demographic data. For this reason herd parameters are referred to in relative terms. Increases in deer and deer sign observed in recent years, as well as fair ~~forage plant~~ productivity, resulting from above average precipitation (see Appendix A), suggest the ~~D12~~ burro

deer herd is in good condition. This observation may be sightings strengthened by ~~the~~ increases in road kills and mountain lion ~~observations~~ which would indicate an increase in the deer herd. Alternatively, these latter observations may be a result of increased human presence in the burro deer range. The only survey of burro deer conducted in recent years occurred during an aerial ~~large mammal~~ survey for large mammals (primarily for bighorn sheep) in December 1988. That survey resulted in the ~~observation and~~ classification of 31 deer, including 3 bucks, 27 does, and 1 fawn. The resulting ratio of 3.7 fawns:100 does might suggest a poor fawn crop at a time when fawn:doe ratios should be close to their highest values (most fawns being born in September) but may ~~probably~~ reflect the small sample size.

<u>Habitat Changes</u>

Deer habitat changes within the D12 zone relate directly to pressures placed upon these areas by a growing human population. Pressures are manifested in the use of desert areas for recreation, mining, and diversion of water for urban use. Factors limiting available habitat have increased in importance in recent years and are discussed in detail in an attached report prepared on the current status of game species and habitats including the D12 zone (see Appendix A). Specific issues related to deer habitat are discussed further.

In an effort to offset specific impacts of canal lining, measures to reduce entrapment mortalities were developed and tested for implementation in future lining projects. Losses threatened to increase dramatically with the lining of the remainder of the Coachella Canal announced by the Bureau of Reclamation (BR) in 1987 as a water conservation measure. Subsequent consultations between that agency, the Department of Fish and Game (Department) and interested public resulted in the development of drowning avoidance measures, including 2:1 sloped canal sides and linear curbing one inch high and three inches wide every 18 inches from the top to the bottom of each side and extending the entire length of the canal. This design was tested with the installation of an in-place lining prototype section of the canal in summer 1989. A live deer was used to evaluate curb effectiveness ~~in entry to and escape from the canal~~. The deer successfully entered and escaped from the canal, and this design was recommended for future Coachella Canal lining operations (White and Thompson 1989).

A program of big game guzzler (BGG) construction was begun in the early 1980s to increase productivity of remaining burro deer habitat. This program has continued, by the Desert Wildlife Unlimited sportsmens association, through recent years. Table 4 lists water developments which have been completed since 1984. In addition figure 1(including 1A-1C) show current water development locations. ~~Note on figures 1A-1C radii of 3 miles are drawn around each water source, this depicts the immediate area which the development might be considered to service (Hervert 1985), placing BGGs or other water sources a maximum of approximately 6 miles apart~~. Figures 1A-1C also ~~demonstrate~~ indicate areas which, according to a ~~this~~ scheme of water placement every 6 miles, require water development. These are discussed further in the management programs, objectives and recommended prescriptions section.

Siltation damming is the process whereby runoff water is temporarily halted and allowed to deposit silt and percolate into the soil. The resultant soil development and higher soil moisture allows the development of vegetation beyond that which previously would have been possible on that particular site. The vegetation produced then increases forage availability, and provides additional cover, for deer and many other wildlife species. Following evaluation of an existing siltation dam ~~situation~~ site, three additional siltation dams were built

BGGs are expected to service a circular area six miles in diameter centered on the guzzler (Hervert 1985). ~~These areas are indicated around BGGs depicted on~~ figures 1A-1C.

Figure 1 - Water Source Development 1984 - 1990.

Figures 1A-1C present water development locations for indicated units.

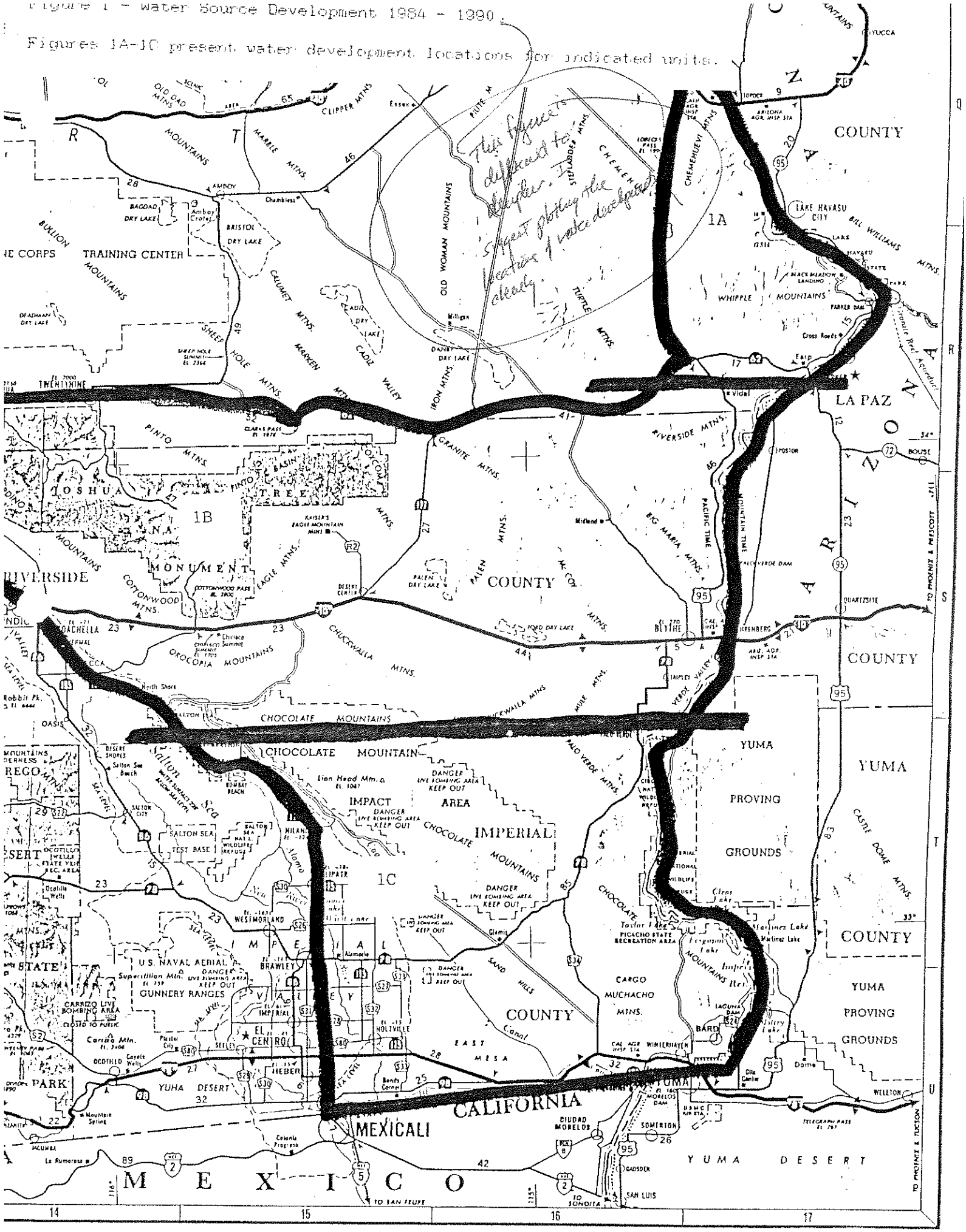
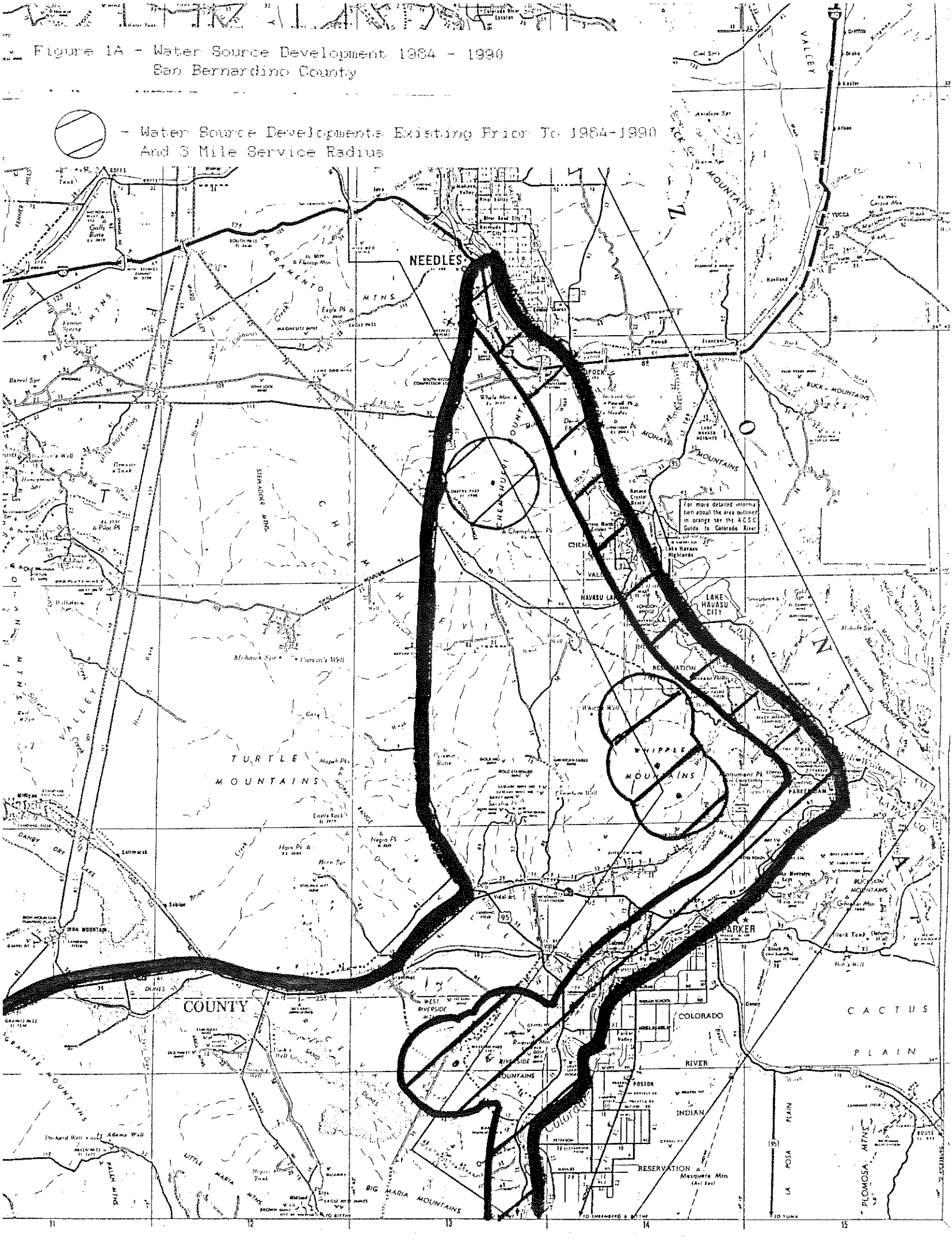


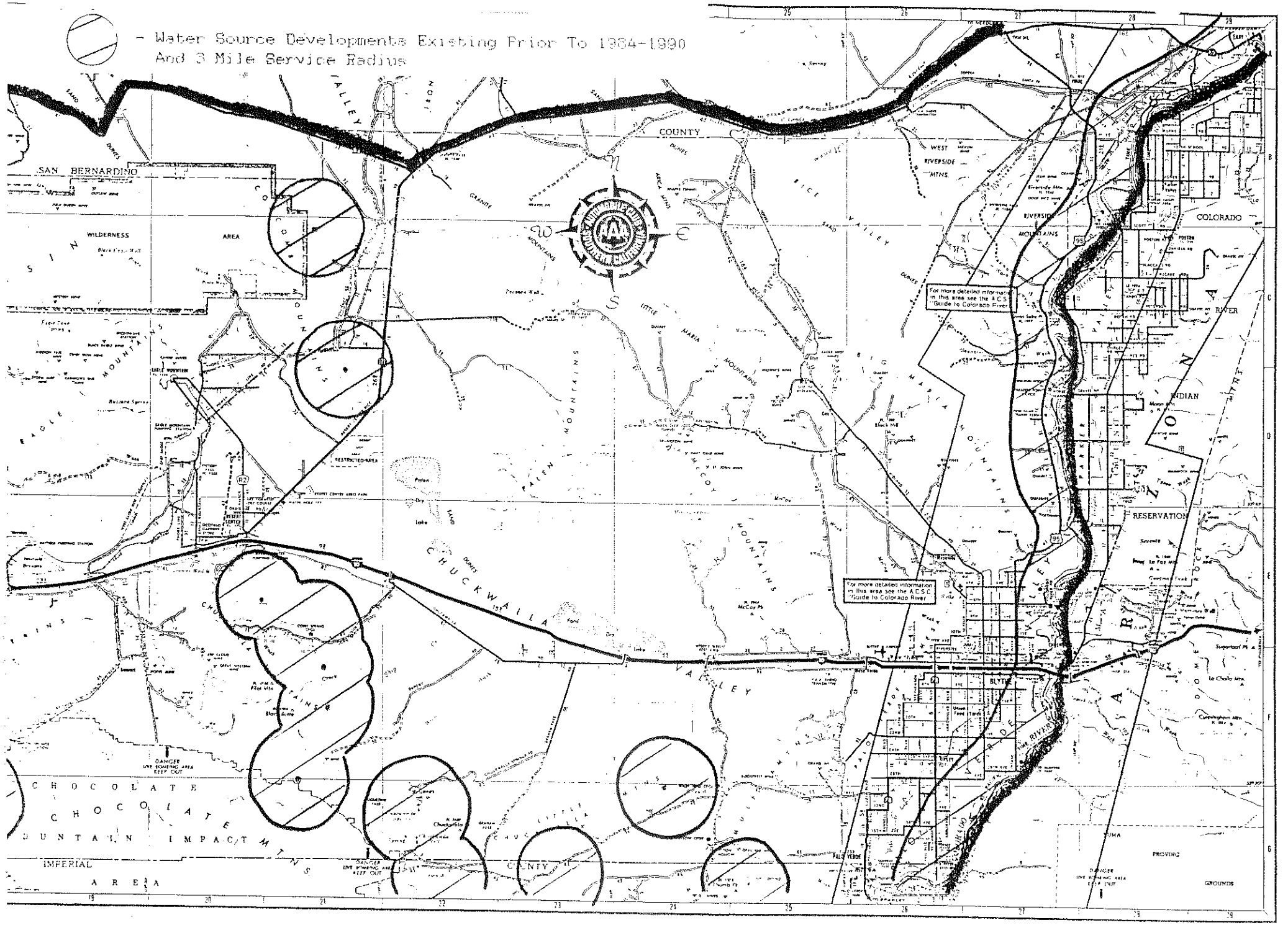
Figure 1A - Water Source Development 1984 - 1990
San Bernardino County

- Water Source Developments Existing Prior To 1984-1990 And 3 Mile Service Radius



Riverside County

- Water Source Developments Existing Prior To 1984-1990
And 3 Mile Service Radius



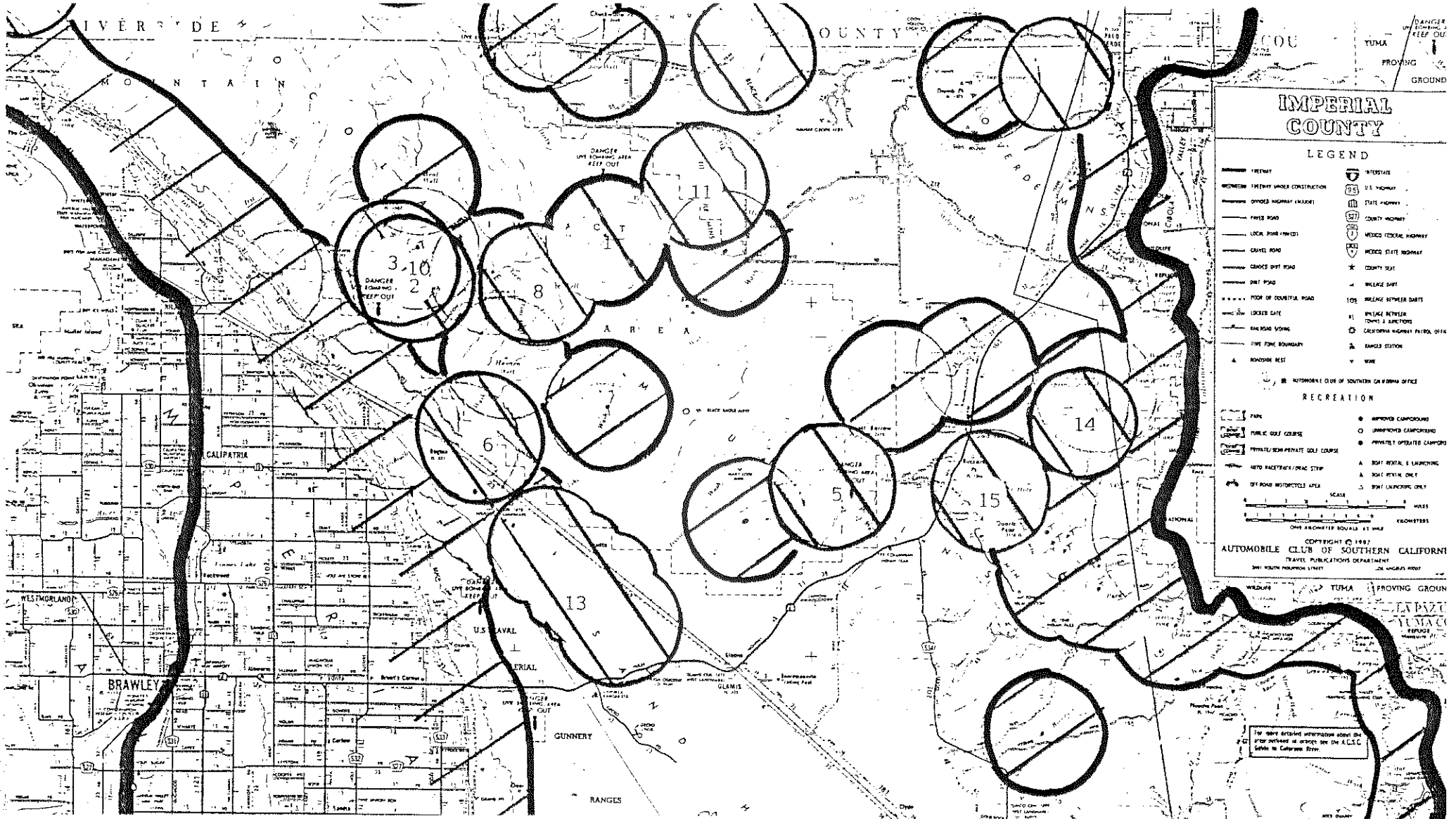


Figure 10 - Water Source Development 1984 - 1990
Imperial County

See Table 4 for numbers corresponding to locations and site names

- Water Source Developments Existing Prior To 1984-1990 And 3 Mile Service Radius

- Water Source Listed in Table 4 And 3 Mile Service Radius

Table 4 - D12 Zone Water Development Projects 1984-1990

Name	Type of Development	Funding Source*	Construction Date
1) Mulevation BGG	Lunchbox** Installed	ICFGC/DWU	1985
2) Barth BGG	" "	ICFGC/USMC DWU	November 1986
3) Beal BGG	" "	" "	"
4) Sheep Rock BGG	Above-Ground Metal Tank Tile Line/Drinker Box Installed	ICFGC/DWU	April 1987
5) Carol Spring	Spring Access Improvement	ICFGC/DWU	August 1987
6) Regina BGG	Lunchbox Installed	BR/DWU	May 1988
7) Black Hills II BGG	" "	CDFG/DWU	August 1988
8) Pegleg Well	Submersible Pump Installed	ICFGC/DWU	February 1988
9) Continental Divide BGG	Modified Lunchbox** Installed	CDFG/DWU	May 1989
10) Beal Well	" " "	ICFGC/DWU	July 1989
11) Middle Mules BGG	" " "	CDFG/DWU	August 1989
12) Chuckwalla Well	Increase Storage Capacity	BLM/DWU	1989
13) Dune Pocket Wells (4)	Modified Lunchbox Installed	BR/DWU	1989
14) Eugene's Trap Tank	Access Improvement	ICFGC/DWU	1989
15) Peter Kane BGG	Modified Lunchbox Installed	CDFG/DWU	1990

* Funding Sources:

DWU - Desert Wildlife Unlimited (personnel, equipment and funding)
ICFGC - Imperial County Fish and Game Commission
USMC - United States Marine Corps (personnel and equipment support)
BR - Bureau of Reclamation
CDFG - California Department of Fish and Game (Hill Bill funding)

**Lunchbox - Buried tank with ramp access into tank, generally filled by tile line placed in wash
Modified Lunchbox - Original constructed tank design replaced with refurbished single wall fuel tanks and ramps plumbed into tank

within the Chocolate Mountain Aerial Gunnery Range. Construction was completed in 1987 by the USMC under the direction of Department personnel. Insufficient localized precipitation has delayed evaluation of these constructions.

Management Unit Goals

While a portion of the management unit goals of the 1984 plan have not been realized many ~~of these management unit goals~~ remain valid. The following discussion relates ~~specifically~~ to management unit goals set in 1984. These goals are summarized and comments on current status are included. In addition, goals for the 1990-1994 period are presented.

1984 Plan Management Unit Goals Summary

Restoration and maintenance of healthy deer herds and the provision for high quality diversified use of deer are the primary plan goals, however, evaluation of these goals has been thwarted by inability to properly survey the burro deer herd.

Maintenance of population at 1984 levels was suggested as a realistic goal based on the contribution of favorable climatic conditions to herd maintenance with potential remaining for periodic adverse conditions and increased human use of desert areas. Favorable climatic conditions have continued and appear to have resulted in herd population increases in recent years. Increased human use of desert areas has occurred. The impacts of this increased use are not fully understood but include possibilities of increased hunter take resulting from increased access to desert areas and displacement of deer due to disturbance.

The primary goal for habitat maintenance was presented as continued maintenance of habitat quantity and quality on both summer and winter ranges.

Herd maintenance potentials are presented in two categories, habitat carrying capacity and mortality factors. These factors are described in worst and best case scenarios. Habitat carrying capacity factors are further described in summer and winter range categories. Tables 4 and 5 of the 1984 plan present summaries of these factors. As a best guess, the figures presented may remain valid.

Summer range worst case factors include potential for 45% herd reduction within 10 years due to habitat loss to agricultural expansion, recreational use of critical summer (riparian) habitats, and lining of irrigation canals for water conservation. Summer range best case factors include the consideration of deer requirements in agricultural development plans, restriction of recreational activities to areas of lower quality wildlife habitat and mitigation of canal lining projects through alternate water source development, fencing, and escape ramp construction. Assuming these best case factors allow for static population levels it is further proposed that interagency habitat development projects might result in a potential 10% increase in herd numbers.It appears that agricultural expansion has not increased at the rate predicted and has not produced the habitat losses expected. Recreational use has increased as expected. The impact of this increase on deer habitat has not been quartified and has not appeared to be of primary importance to land management agencies. Canal lining has been proposed. Alternate water source development is ongoing

2. Additional herd performance indicators.

a) Obtain hunting success information from refuges and indian tribes.

b) Delineate ranges and corridors within each subunit.

c) Determine deer density and habitat values within Salton Wash.

d) Determine deer densities in representative habitat types to obtain indices for overall population estimates.

e) Support feeding and forage investigations.

Of the five items listed above as additional prescriptions, item b) and possibly e) are the only items that have been addressed to any considerable degree. Information of the type called for in these two prescriptions was collected during the telemetry study described in the 1984 plan and remains to be developed in report form.

The primary emphasis of this plan is on goals and objectives obtainable in the next five years. Considering that little progress has been made on the majority of the above additional prescriptions, it appears these, with the exception of item d) (see item a) below), should not be included as prescriptions for the period of this plan. Should progress be made in more basic information collection over the period of this plan these prescriptions should certainly be reconsidered.

2A. Additional herd performance indicators for the 1990-1994 period.

a) Collect data on burro deer densities in relation to various habitat types and seasonal distribution. - Item d) (above) calls for collection of ~~potentially valuable~~ information for the estimation of herd parameters. Data of this type could be collected in conjunction with Inventory and Investigative Element - Prescription 1. part b) and will remain as a prescription of this plan.

b) ~~Develop~~ Summarize data collected during 1982-1983 burro deer radio telemetry study in report form. - ~~As noted above data called for in items b) and e) has been collected but remains to be developed as a report. This reporting effort has been ongoing since the data collection period. Additional effort will be exerted to complete the effort.~~

c) Determine herd physical and reproductive condition through data collection from roadkills, canal deaths, harvested animals and other mortalities. Data collection could be conducted in conjunction with disease investigations (see B. Herd Management and Mortality Control Element-Objective, part 4.).

B. Herd Management and Mortality Control Element

Objective: Reduce all causes of mortality other than legal harvest to offset anticipated losses from habitat reduction.

Recommended Prescriptions:

1. Minimize ~~road kill potential~~ the number of deer killed by motor vehicles. how?

2. Reduce human and ORV disturbance.

3. Evaluate canal lining effects and recommend loss preventative measures.

The road kill potential of U.S. Highway 95 has been realized. The occurrence of road kills has also increased along Ogilby road and State Highway 78 but has not reached levels of critical concern at this time. Human and ORV disturbance continues to occur but has been legally limited by designated areas ~~access to~~ lands managed by the BLM. Canal losses have been evaluated extensively and appropriate measures, in the form of modified canal design, have been developed. Alternative water source development has been ongoing and may reduce the impacts of losses experienced as a result of the above factors.

The above prescriptions will remain in effect for the 1990-1994 period with some modification. Although discussions with Caltrans and Colorado River Indian Tribes may still include underpass and fence construction, placement of warning signs along highways 95 and 78 and Ogilby Road as road kill reduction measures is considered to be the most likely objective to be completed within the 1990-1994 period. Figure 2 depicts locations requiring deer crossing warning signs. As legal limitations on access to the majority of desert habitats are in place, emphasis will be on enforcement of existing regulations. As noted above canal lining loss preventative measures have been evaluated and recommended. Emphasis regarding this issue will focus on insuring the inclusion of these measures in future canal lining projects. In addition, the potential for incorporation of canal related mortality avoidance measures into existing lined canal sections will be investigated.

In addition the following prescription is included for the 1990-1994 period.

4. Investigate the extent of livestock disease related wildlife mortality associated with the burro deer herd. - This prescription entails the sampling of deer, other wildlife species and livestock, where proximity may suggest disease transmission. Collections of this type have been initiated involving goats in the Salt Creek area and bighorn sheep in the Chocolate, Orocopia, Chuckwalla and Whipple Mountains.

C. Habitat Element

Objective: Maintain riparian habitat, increase carrying capacity of desert habitats and protect all deer habitats from degradation.

Recommended Prescriptions:

1. Continue ongoing habitat prescriptions.

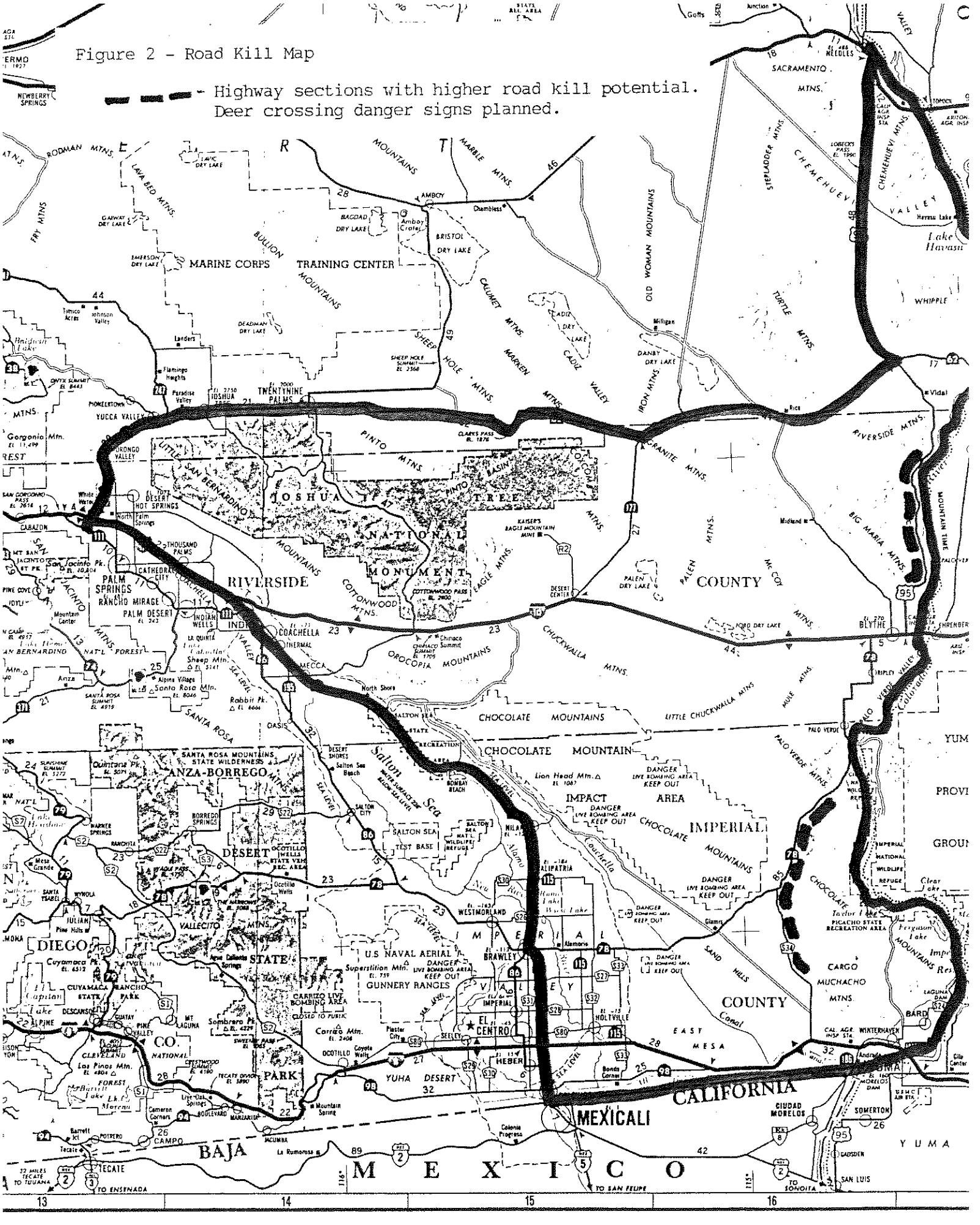
a) Monitor land use changes to document adverse impacts listing actions to offset negative impacts and deer habitat loss.

b) Determine needs and pursue land exchange or acquisition to protect critical habitats.

c) Coordinate with BLM, Colorado River Indian Tribes, Desert Wildlife Unlimited and Palo Verde Rod and Gun Club to develop herd unit water distribution program.

Figure 2 - Road Kill Map

- - - - Highway sections with higher road kill potential. Deer crossing danger signs planned.



d) Document effectiveness of water source development. How?

e) Maintain water source book records.

f) Coordinate with BR to accomplish mitigation commitments.

All of the above prescriptions continue to be addressed to some degree. Land uses have been monitored and, through the environmental evaluation process, impacts have been mitigated to the extent possible under that system. Habitat needs are known in a general sense and protection efforts have proceeded through habitat management plans developed through coordination with the BLM, the primary land management agency involved in these desert habitats. No acquisitions have been proposed with deer habitat requirements as a primary impetus. Assuming the possibility of completing two water source developments each year, potential exists for development of ten water sources within the 1990-1994 period. Locations of these ten potential sources are presented in figures 3B and 3C ~~3A including 3A-3D~~ as well as locations of potential sites for water source development beyond 1994. Documentation of water source effectiveness occurs with periodic visits to individual sites. No formal evaluation is currently planned, however, with several effective water sources in place a formal evaluation of source effectiveness may be developed. The water source book has been, and will continue to be, updated regularly. BR mitigation commitments, expanded to include alternate water source development away from the Coachella Canal, in addition to Rock Quarry, have been completed through the construction phase and require only BR maintenance at this time.

Again, this information could be better incorporated with each subheading in each section. I think it will be more clear as much easier to update if structured in that way.

2. Recommended future habitat management goals.

a) Develop guidelines for maintaining deer habitat in riparian zones.

b) Coordinate with Colorado River Indian Tribes to develop deer habitat maintenance guidelines.

c) Develop cooperative programs for deer habitat maintenance with various State and Federal agencies.

d) Coordinate with Planning Commissions and Boards of Supervisors to resolve potential land use/deer habitat conflicts.

e) Coordinate with BLM in assessment and minimization of mining impacts to deer habitat.

f) Coordinate with BLM in reconciliation of ORV activities and deer habitat requirements.

Riparian habitats, both within and outside tribal lands, are areas of special concern and projects proposed within these areas receive considerable evaluation. Cooperative programs both formal and informal are in effect for most areas of concern as deer habitat. The environmental review process requires coordination with planners and supervisors in land use planning as does impact assessment and mitigation for activities on Federal lands.

As noted above, attainable goals and objectives are emphasized in this plan update. As limited personnel time and funding have not allowed for in depth consideration of the proposed additional habitat management goals to date,

Figure 3 - Water Source Development 1980 - 1984

Figures 3A-3C present water development locations for indicated units.

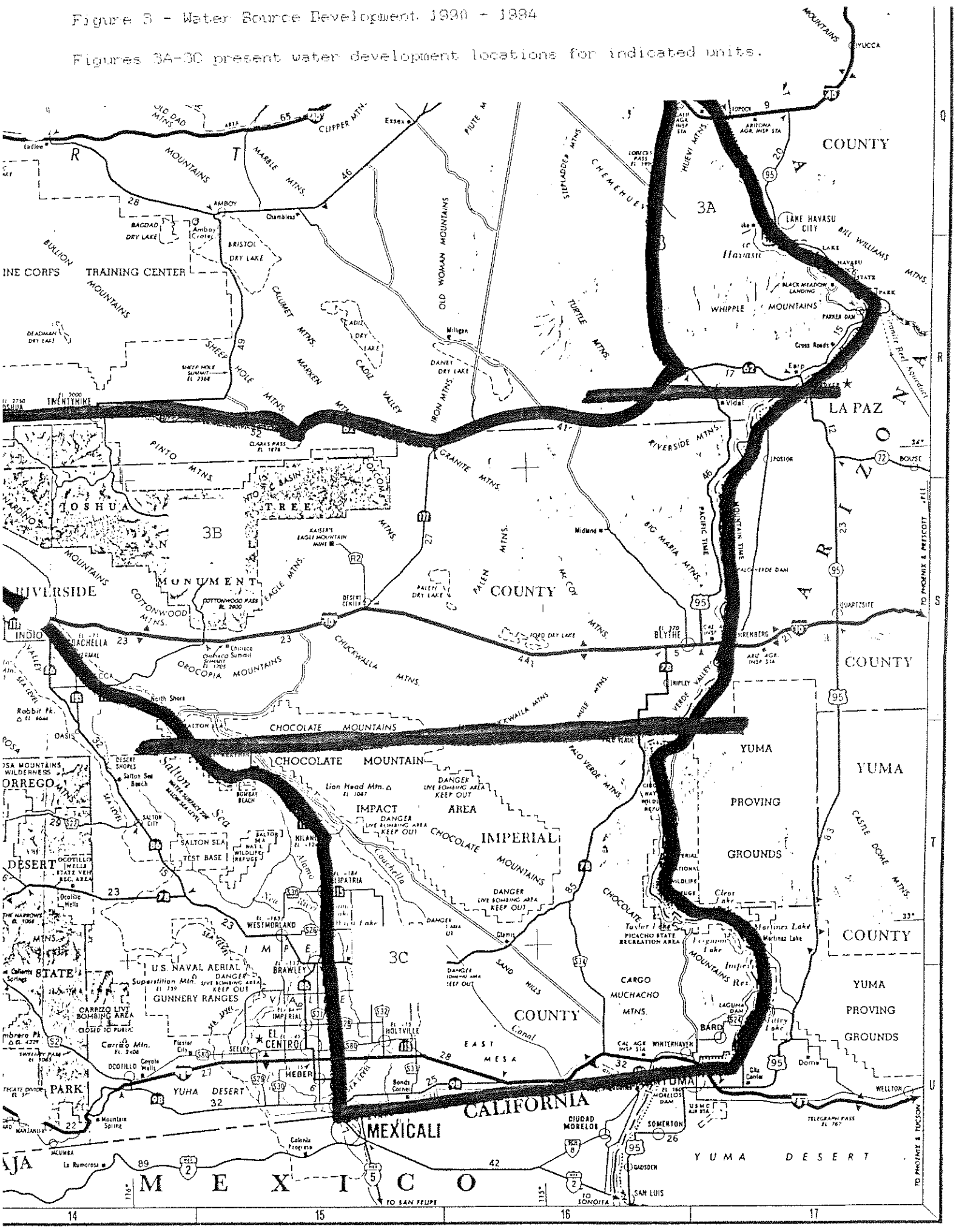
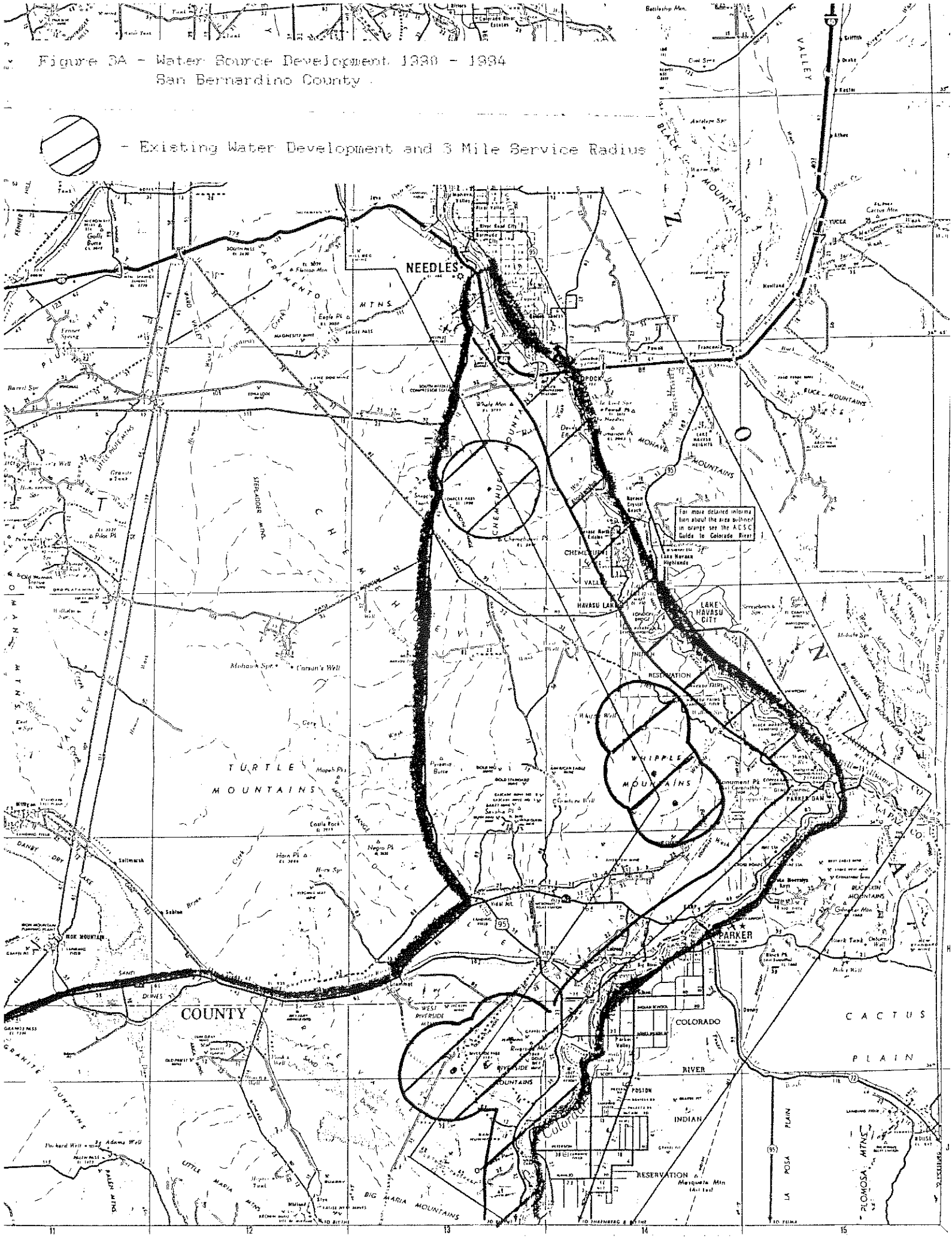


Figure 3A - Water Source Development 1980 - 1984
San Bernardino County

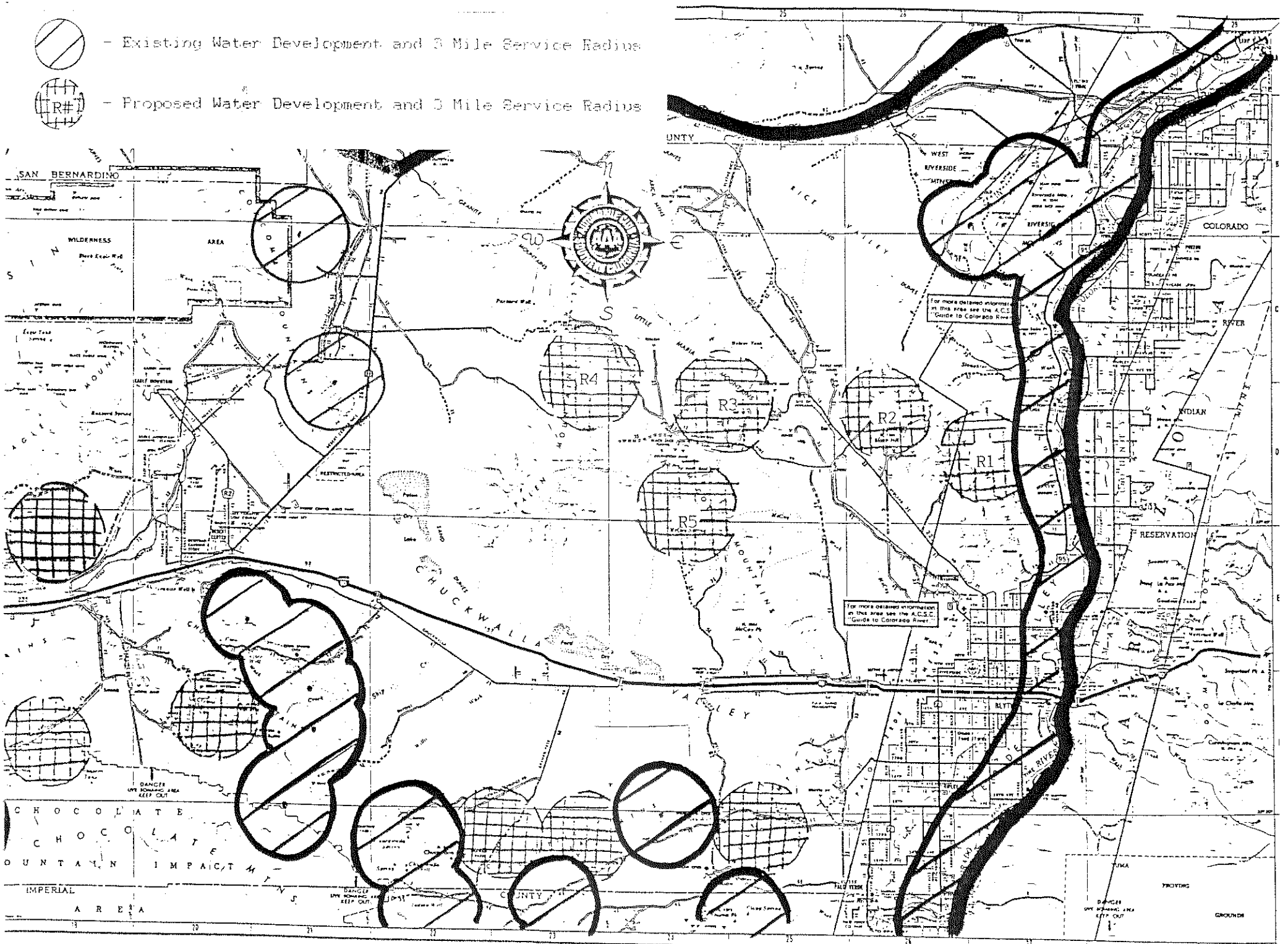
- Existing Water Development and 3 Mile Service Radius



Riverside County

- Existing Water Development and 3 Mile Service Radius

R#1 - Proposed Water Development and 3 Mile Service Radius



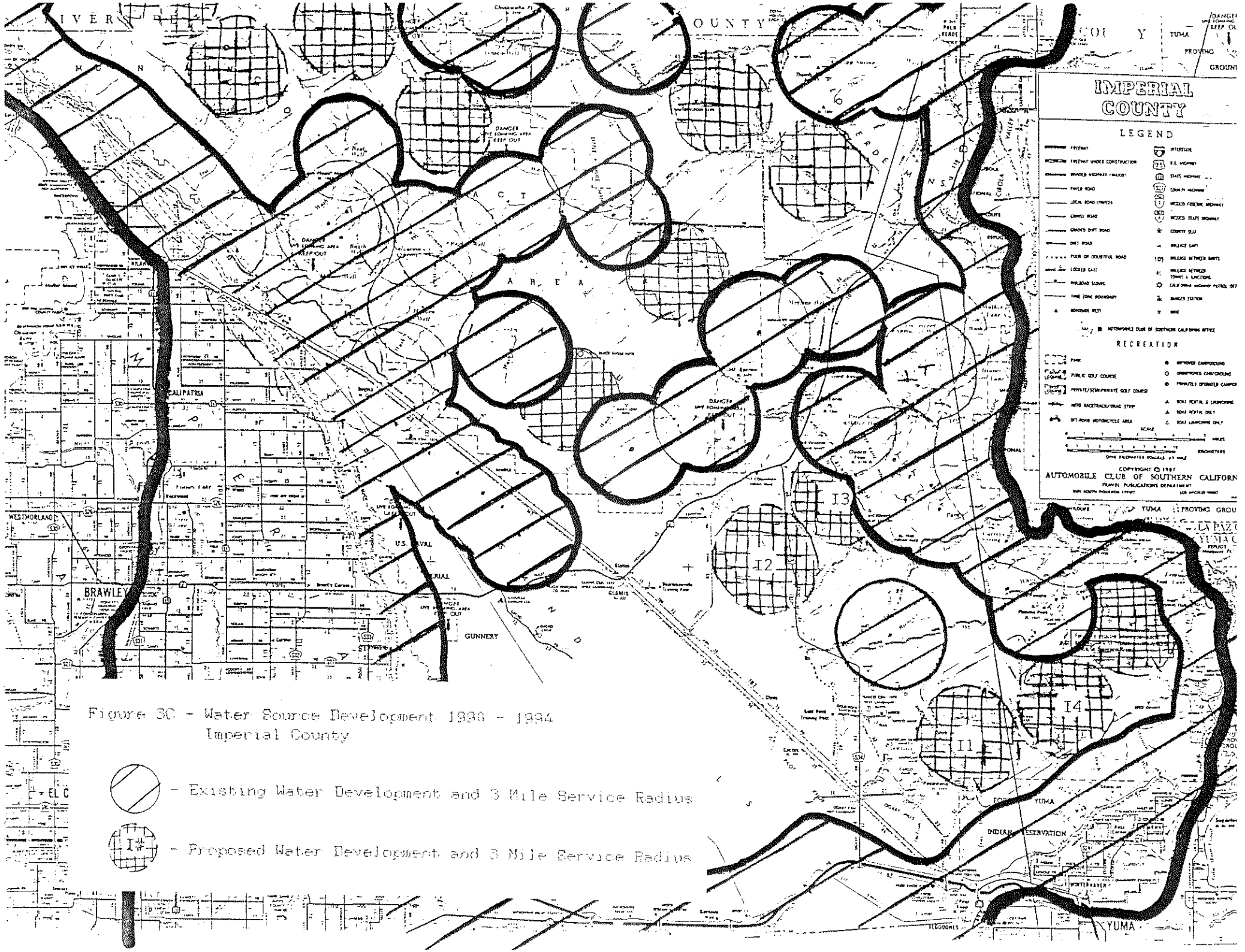


Figure 30 - Water Source Development 1980 - 1994
Imperial County

- Existing Water Development and 3 Mile Service Radius

- Proposed Water Development and 3 Mile Service Radius

items listed in that section of the 1984 plan will not be pursued beyond those efforts described above.

D. Utilization Element

Objective: Maintain a viable deer population in the Riverside, Whipple and Central subunits for future consumptive and nonconsumptive use.

Recommended Prescription:

1. Coordinate annual harvest strategies and assessments with Colorado River Indian Tribes.

Currently no coordination has been attempted with Colorado River Indian Tribes. Reported harvest on tribal lands has been minimal, reducing priority of this issue. This item will not be included as an objective for the 1990-1994 period unless reported harvest indicates need.

Is it this is not a priority and you really don't plan on collecting this information, why not delete it?

Objective: Provide for a minimum sustained annual legal harvest of 30 bucks.

Recommended Prescription:

1. Develop a coordinated program of habitat improvement directed toward support of deer population numbers sustaining a legal harvest of 30 bucks ~~minimum~~ at least through the development of water sources (figures 3B and 3C).

This prescription relates directly to the ~~Habitat~~ Element section Objective, Recommended Prescription 1 (part c) ~~and~~, as discussed in that section, a plan has been developed (~~Figures~~ 3A-3C).

Objective: Provide for high quality consumptive and nonconsumptive use of the burro deer resource.

Recommended Prescriptions:

1. Encourage hunting during weekdays and after opening weekend to lessen hunter density.

Encouragement by wardens and other persons contacting hunters may facilitate this item.

2. Indicate to nonconsumptive users the "closed zone" of the Cibola National Wildlife Refuge as a location for deer observation and photography.

Notification by wardens and other persons contacting nonconsumptive users may facilitate this item. It should also be noted that opportunity for nonconsumptive uses such as those described exist throughout the burro deer range.

E. Law Enforcement Element

Objective: Increase the effectiveness of law enforcement activities in reducing the illegal kill in zone D12.

1. Concentrate patrol activities in areas of higher deer density.

2. Coordinate patrol efforts.

3. Schedule night patrols.

4. Arrange stakeouts.

5. Conduct undercover patrols.

6. Investigate potential of county Fish and Game Commission rewards in conjunction with CalTIP funds.

7. Provide DFG phone numbers and officer locations to cooperating agencies.

8. Coordinate patrols with deer movements.

9. Recommend ORV restriction regulation for inclusion in Fish and Game Code.

Regular Wildlife Protection patrols have been ongoing. With the exception of item #9, which has been and will likely continue to be addressed through BLM regulations, the above prescriptions have been pursued and will be included in patrol efforts for the 1990-1994 period.

F. Communication of Information Element

Objective: Increase public awareness of the status of the burro deer herd, and convey as much specific information as possible considering the herd to interested publics.

Recommended Prescriptions:

1. Provide summary of the herd plan to interested publics.

2. Seek publicity through media, particularly regarding new management procedures.

3. Inform landowners, miners and ORV organizations of activities benefiting deer.

4. Provide information, including technical data, to agencies and groups interested in deer resource.

5. Educate public regarding role of Federal refuges.

6. Prepare an article for the Tracks newsletter about Burro deer?

The above information ~~has been~~ and will continue to be provided to interested persons, agencies and organizations. Department personnel provide information regarding the majority of these items. Federal refuge information is distributed by refuge personnel.

G. Review and Update

Objective: Provide an annual review and update of the herd plan.

Recommended Prescriptions:

1. Coordinate with interested agencies, organizations and landowners for annual review and discussion of herd plan accomplishments and objectives.

2. Provide annual status report of herd condition, habitat status and research conducted.

Limited personnel time has not allowed for annual review of the herd plan in recent years. This herd plan update and supplement is a compilation of information which is suggested for annual provision. However, annual review is considered important, and efforts will be made to complete this recommended prescription. To facilitate annual review a report form has been developed to summarize efforts of the previous year (Appendix E). Reports completed would be available to agencies, organizations and individuals expressing interest. As has occurred in the past, it appears that limited time will not facilitate regular annual meetings. Should discussion between interested parties be necessary, such a meeting may be developed.

Alternatives

A. No habitat improvement and no herd management

The no action alternative is discussed and rejected as detrimental to the burro deer herd and contrary to legislative mandate. Issues raised remain valid.

B. Manage for trophy bucks

This particular management and harvest strategy is discussed and rejected as unnecessarily intensive. Recent years harvests have born out the suppositions of this decision in that a majority of three point or better bucks (70% of bucks taken between 1984 and 1989) continue to be harvested. Also, public response opposing recently proposed regulation changes supported the current harvest strategy, further supporting suppositions regarding rejection of this alternative.

C. Manage for maximum feasible habitat productivity and maximum sustainable yield of deer.

This management strategy is discussed and rejected as intensive beyond current knowledge and available personnel time and funding, and unrealistic in light of habitat pressures being experienced. Issues raised remain valid.

Literature Cited

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Appendix A

California Environmental Quality Act

Compliance Reports

Upper and Lower Colorado River

Wildlife Management Units

November 1989

CEQA Compliance Preparation
Habitat Report
Lower Colorado River Unit

Submitted by: Rocky Thompson
Wildlife Biologist
LCR Unit Manager

The following report provides an overall assessment of environmental and land use factors and trends relating to habitat requirements of hunted species of the lower Colorado river wildlife management unit (unit), Region 5. Factors and trends discussed include general land use, livestock grazing, timber harvest, fire, water development, recreation, weather, introduced species and threatened/endangered species considerations. Hunted species considered include big game, upland game and waterfowl. Information provided may be considered to be the professional opinion of the unit manager unless otherwise noted.

Unit Description

The lower Colorado river wildlife management unit includes all of Imperial County and Riverside County from Interstate 10 south between Indio and the Colorado river. The unit consists primarily of Colorado desert habitats with the riparian zone of the Colorado river bordering the eastern boundary and the Salton Sea dominating the north central portion of the unit. The Coachella valley north of the Salton Sea, the Imperial valley south of the Salton Sea and the Palo Verde valley south of Blythe are dominated by agriculture with interspersed wetlands habitats produced intentionally as on private duck clubs, Federal refugia and State wildlife areas or unintentionally as along canals and drains. The large majority of the unit human population resides in either the Coachella or Imperial valleys. While lands in these valley areas are primarily in private ownership the remainder of the unit is primarily public lands administered by the Bureau of Land Management (BLM) as part of the California Desert Conservation Area or the military as the Chocolate Mountain Aerial Gunnery Range (CMAGR), the Superstition Hills Impact Range or various small parcels.

Species and Habitats

The burro mule deer (*Odocoileus hemionus eremicus*) is the only big game species currently hunted in the unit. Desert bighorn sheep (*Ovis canadesis nelsoni*) also occur within the unit but hunts of this species occur only on two populations, neither of which occur within the unit. Habitats utilized by deer include primarily, but certainly are not limited to, riparian and desert wash areas east of the Salton Sea, Coachella and Imperial valleys (Celantano and Garcia, 1984). Deer utilization of agricultural areas occurs in the Palo Verde valley and to a lesser extent along the eastern boundary of the Imperial valley. Bighorn sheep typically utilize the more mountainous habitats of the Chocolate, Orocopia and Chuckwalla mountains.

Upland game species occurring within the unit include mourning dove (*Zenaidura macroura*), whitewing dove (*Zenaidura asiatica*), Gambel's quail (*Lophortyx gambelii*), pheasant (*Phasianus colchicus*), and cottontail rabbit (*Sylvilagus audubonii*). All of these species utilize various agricultural areas within the unit and can be found, with the exception of pheasant, in the desert as well; primarily in riparian and

wash habitats.

As noted above wetlands habitats occur in the Coachella and Imperial valleys. These wetlands are chiefly located peripheral to the Salton Sea and in conjunction with the Salton Sea support a large number of waterfowl species. Additional waterfowl are also supported along the Colorado river.

Factors and Trends

1. Land use

The population of Imperial County has increased approximately 10% since 1985 (Dept. of Community Economic Development, County of Imperial - communication). Urban development associated with this growth in population has increased steadily throughout recent years in the Coachella and Imperial valleys and to some extent in the Palo Verde valley. This development has focused almost exclusively around previously urbanized areas and as such has impacted agricultural land uses much more directly than wildlife habitat. As noted above the large majority of private land available within the unit occurs in these valley areas suggesting that future urban development will be limited to these areas. This further suggests that the primary direct impact of urban development on wildlife species and habitats will be associated with changes in agricultural land uses and affect wetlands/waterfowl and to some extent upland species and habitat. Although parcels of private land are scattered throughout the desert these remain remote and development has been limited to a very few dwellings. Assuming no major changes in this trend direct impact of desert habitat development for "urban" uses should be minimal in the near future.

Exploration and development of the geothermal resources of the unit has increased dramatically in recent years. This development has focused on the known geothermal resource areas (KGRA) at the south end of the Salton Sea, with six plants built since 1984, and on the East Mesa located east of Holtville where four power plants have been built since 1984 (County of Imperial, 1989). A third KGRA located in the unit is located near Calexico in the southern Imperial valley. The primary impact of this geothermal development as regards hunted species has been to wetlands and waterfowl. The south Salton Sea KGRA includes some of the most attractive waterfowl habitat available in the unit, producing an average of 52% of the mid-winter waterfowl count total for Imperial, Riverside, San Bernadino and inland San Diego Counties for 1986-1989 (State of California, 1986, 1987, 1988, 1989). Impacts associated with geothermal development include direct loss of land, powerline strike mortalities, potential pollution as a result of accidental geothermal fluid release and possibly harassment of wildlife through increases in noise, light and general human activity. To date geothermal development companies have been fairly cooperative in the pursuit of mutually acceptable strategies for coexistence of development interests and wetlands. This cooperation has focused on research into the impacts of geothermal development on wildlife and in some cases direct acquisition of land for wetlands development to offset losses experienced elsewhere. It remains to be seen whether this

cooperation continues in the future. Geothermal development on the East Mesa may affect upland game species most directly but the resource is limited in this area and impacts are likely minimal. The Calexico KGRA is located in an agricultural area and is not likely to impact game species other than possibly a limited number of pheasant.

Mining, primarily for gold, has occurred in the unit since before the turn of the century. However, recent advances in gold mining technology, specifically in sodium cyanide heap leach gold extraction, have increased the potential for impact to wildlife habitat and species well beyond previous possibilities. During the heap leach process enormous quantities of ore are unearthed and spread over large pads through which the cyanide solution is leached and the gold extracted in solution. Impacts to wildlife associated with this process include direct loss of habitat due to the extensive area required for ore extraction and pad construction and direct loss of individuals through ingestion of toxic cyanide solution. Game species affected by the growth of cyanide heap leaching operations include deer and bighorn, primarily through loss of habitat as fencing of these operations is common and generally excludes large mammals, desert upland and waterfowl; upland game and waterfowl species primarily through the attractiveness of solution ponds in these arid areas and subsequent poisoning of those individuals which come in contact with the leaching solution. Currently operations of this type are being conducted in the Chocolate mountains at Gold Fields east of Glamis (2,265 acres) and Picacho Peak on the Colorado river (642 acres) and in the Cargo Muchacho mountains at the American Girl mine (1,164 acres) (BLM, El Centro Resource Area - communication). BLM, the administrating agency for those lands currently utilized for the above described operations which are not yet patented, considers mining to be nondiscretionary under current mining law. Barring any changes in the mining law it must be assumed that operations of this type will continue to increase as long as economically feasible. Currently it appears economically feasible to pursue this type of mining operation throughout the southeastern quarter of the unit. This pursuit has increased rapidly in recent years and appears to be continuing; as evidenced by Gold Field plans to expand operations by fifty acres per year for the next twenty years (BLM, El Centro Resource Area - communication). Gold Fields expansion plans have been noted as an immediate threat to habitat of the CMAGR and have been opposed in resource management recommendations (Thompson, 1989c).

2. Livestock grazing

The Ford Dry Lake grazing allotment is the only allotment occurring in the unit. It consists of 63,520 acres of ephemeral domestic sheep range and has not been utilized to graze sheep since 1980 (Dept. of Interior-BLM, 1983). In an effort to avoid the possibility of disease transmission to bighorn to be translocated to the Chuckwalla mountains adjacent to the allotment an amendment to the CDCA Desert Plan was suggested which would eliminate the Ford Dry Lake allotment south of Interstate 10 (Blymeyer and Thompson, 1988). Subsequent to discussion and consideration over a minimum two year period the BLM has consented to the allotment amendment. Following finalization of the amendment in

the fall of 1989 no livestock grazing on public lands will be allowed within the unit.

Minimal grazing of livestock on private property occurs at various locations throughout the unit. The effects of this grazing are considered to be minimal in direct impact to wildlife habitat but may be a factor in disease transmission to deer and bighorn. To avoid the possibility of disease transmission to wildlife from domestic goats animals that had been allowed to graze department land through an agreement with caretakers on the Salt Creek Wildlife Area were removed in 1988. These animals were subsequently moved to adjacent private property.

3. Timber harvest

No timber harvest occurs within the unit.

4. Fire history

Due to the sparse nature of the vegetative cover the danger of large scale loss of wildlife and habitat is virtually nonexistent throughout the large majority of the unit. The exception to this situation occurs along the Colorado river where vegetation of the riparian zone produces relatively dense stands which are susceptible to wildfire. In recent years fires have occurred in this riparian zone at Goose Flats south of Blythe and at Ferguson Lake north of Winterhaven. The Goose Flats fire burned approximately 200 acres in 1988. Rehabilitation work is proceeding in an effort to develop cottonwood and mesquite stands, desirable wildlife habitat, before saltcedar, undesirable as wildlife habitat, claims the area. The Ferguson Lake fire destroyed an estimated 800 acres on the California side of the river in 1989 (Dept of Interior-BLM, 1989). Minimal rehabilitation of this area has been pursued at this time. Game species impacted by burns in these riparian areas include deer, quail, dove, rabbit, and to a lesser degree waterfowl.

No control burns have been pursued within the unit.

5. Water development

Water development in the form of irrigation canals is extensive throughout the Coachella, Imperial and Palo Verde valleys. These canal and drain systems deliver Colorado river waters for agricultural and domestic uses and, as noted above, in various locations produce small wetland and riparian situations suitable for some waterfowl and upland species which occur in these agricultural areas. Deer and bighorn utilize waters of the Coachella Canal which extends from the Imperial valley to the Coachella valley east of the Salton Sea.

In 1980 the upper third of the Coachella Canal was redirected through a cement lined channel as a water conservation action. Previously earthen canal sides were replaced by a steep, smooth cement canal lining which, due to extreme difficulty in water access and exit, resulted in deer losses to the extent that a significant reduction in the local

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July 1989

Deer Hunt CEQA Compliance Preparation
Upper and Lower Colorado River Management Units

Prepared By:
Rocky Thompson
LCR Unit Manager

Deer Herd: Burro Deer Herd - D12 Zone
County: Imperial, Riverside and San Bernardino Counties

A. Description of the Deer Herd Management Unit

1. Herd Condition:

The wide distribution and low density of the burro deer herd, in conjunction with a tendency to remain under cover, make attempts to quantify herd parameters such as population size and composition difficult and costly. Therefore, discussions of herd condition are primarily based on general observations and referred to in relative terms.

Reference: Celantano and Garcia, 1984

Overall, the burro deer herd is in good condition.

a. Individual animal condition:

An average of 38 deer/year have been harvested over the past five years. Due to the large area occupied by the burro deer and the relatively few deer taken attempts to collect data on individual animal condition during the regular hunting season have not been discussed. Alternate sources of this information have not been pursued as road and train kills are infrequent and distribution and sparse density make significant collection efforts impractical. No data on individual condition is currently available. However, field observations suggest that generally animals are in good condition.

Reference: State of California, 1989

Thompson, 1989a

b. Herd health

No data (ie. herd composition, fawn survival, etc.) is currently available regarding herd health.

2. Population Size:

Historical reports suggest a burro deer population size of approximately 2000 animals in 1952. In 1984 the population was considered to be high due to favorable climatic conditions. Current field observations indicate that for the past three years the burro deer population has remained high. This observation is based on deer sightings, although as stated above no censuses have been conducted, as well as deer sign observed.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

3. Herd Statistics:

	Harvest		Fall		Spring
Year	Bucks	Antlerless*	Bucks	Fawns	Fawns
1984	44	0	No Data Available		
1985	26	0	"	"	"
1986	46	0	"	"	"
1987	35	0	"	"	"
1988	39	0	"	"	"

* No antlerless hunts have been conducted or proposed within the D12 zone.

Reference: State of California, 1989

4. Deer Hunting

a. Past and current hunting strategies' effects on:

1. deer numbers:

As no accurate population size estimate is available, estimates of hunting strategy impact on the herd as a whole are not currently quantifiable. However, historical estimates of 2000 animals in conjunction with current observations suggesting the population is at high levels and may be well above that 2000 mark indicate that hunter harvests of an average of 38 bucks/year over the past five years would not have significantly impacted the population. Note that hunter harvest has increased significantly in recent years from a five year average of 19.1 bucks/year from 1977-1982 to the present average noted above. This recent increase in hunter take may have resulted from high population levels but may also reflect increased access to desert areas and increasing hunter pressure resulting from urban growth in Southern California.

2. herd composition:

Again, no data is available regarding herd composition. However, the very low percentage of bucks taken, in comparison to estimated herd size, during the D12 hunt is considered to have little impact on herd composition. This observation is further supported by incisor age analysis of samples taken from harvested bucks. This analysis does not suggest an inordinate harvest of a particular age class or subsequent harvest impact on composition.

3. herd health

No data is available regarding herd health in relation to the effects of past and current hunting strategies. Except to reiterate observations of the apparent good condition of the herd in light of those strategies.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

b. Future and proposed hunting strategies' effects on:

No changes in hunting strategies are planned for the D12 zone. It is assumed that current trends with regard to hunting and herd numbers,composition and health will continue.

5. Illegal Harvest

Although no hard data was available, 1984 estimates suggested an illegal harvest level 100% higher than the legal harvest. Currently no additional data is available to suggest a change in this estimated loss.

6. Other

Losses associated with road kills, train strikes and canal drownings continue to be realized. Road kills and train strikes are infrequent and do not likely impact the herd as a whole significantly. Canal drownings have impacted the herd in the vicinity of the Coachella Canal significantly in the past. These drownings have tapered off in recent years and canal lining modifications designed to eliminate deer drownings have been evaluated and will be included in future canal lining projects.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

Thompson, 1989b

B. Non-human Effects on Deer

1. Weather

a. drought

Average precipitation for Imperial County, in which the large majority of burro deer are located was 22% above normal for 1986-1988. This increase equates to .51 inches over the thirty year average of 2.35 inches. In this arid habitat such increases in precipitation are not generally realized on an other than local level. However, deer are observed traveling long distances in search of areas of local precipitation and

subsequent increased forage production and may take advantage of an overall increase in precipitation. This ability to utilize overall increases in precipitation may be a factor in the apparent high population numbers observed in recent years. The current precipitation total for 1989 is .46 inches suggesting that 1989 may be a drought year in this area. As an arid habitat inhabitant burro deer are known to alter behavior patterns in response to drought conditions and will likely remain closer to the Colorado River, Coachella Canal and other more permanent water sources during any future dry periods. Extended drought periods will likely be reflected in reduced herd productivity.

b. early storms

Response of burro deer to precipitation is generally rapid and in the case of localized summer thundershowers results in movement toward areas of precipitation and increased forge production. The more generalized dispersal of winter storms results in a less focused dispersal pattern. In general, any measurable precipitation will elicit a response by burro deer on at least a local level. Precipitation occurring prior to fawning, August - September, may benefit fawn survival.

c. mild winters

Winters are generally mild in Imperial County and not considered limiting to burro deer. Mild summers are certainly less stressful to deer. The current high population levels may also have resulted, at least partially, from mild summers experienced during the few years prior to 1989.

2. Predators

A small number of mountain lions occur within the burro deer range. Sightings of lions are rare and the impact of lion kills on the deer population as a whole is currently unknown. Mountain lion observations have increased in recent years, possibly reflecting high deer population levels. Coyotes occur throughout the burro deer range and may be responsible for a limited number of deer mortalities. No data is available regarding the extent of deer loss to coyotes.

3. Disease and Parasitism

During the 1980 deer capture for a movement, behavior and habitat preference study blood samples were taken from seven deer. Analysis of these samples suggested that deer in the capture areas had been exposed to bluetongue in all cases and bovine viral diarrhea in two cases. No exposure to brucellosis, infectious bovine rhinotracheitis, leptospirosis, anaplasmosis or parainfluenza-3 were detected in those deer sampled. Papillomae have also been observed in burro deer. The impact of disease exposure to burro deer is unknown but thought to be minimal at

this time due to lack of observations to the contrary. Bot-fly larvae, tapeworms and arterial worms have been known to parasitize burro deer.

Reference: Celantano and Garcia, 1984

Thompson, 1989a

Thompson, 1989b

C. Effects of Current Deer Hunting and Proposed Hunting

Currently burro deer hunting strategies include a season of less than one month and quota of 1300 tags of which approximately 1000 are sold annually. This relatively limited hunt in conjunction with the wide distribution of burro deer and resulting dispersal of deer hunters results in minimal impact in any particular area as a result of deer hunting. No changes in these hunting strategies are proposed.

1. Effects Upon Species of Special Concern

a. Changes in local populations

No changes in local populations of species of special concern have been observed or are expected as a result of deer hunting activities.

b. Changes in regional and statewide populations

No changes in regional or statewide populations of species of special concern have been observed or are expected as a result of deer hunting activities.

2. Effects Upon Other Wildlife Species

a. Changes in local populations

No changes in local populations of other wildlife species have been observed or are expected as a result of deer hunting activities.

b. Changes in regional and statewide populations

No changes in regional or statewide populations of other wildlife species have been observed or are expected as a result of deer hunting activities.

c. Changes in health, condition and age class structure of populations

No changes in health, condition or age class structure of other wildlife species have been observed or are expected as a result of deer hunting activities.

d. Changes in mortality factors

No changes in mortality factors affecting other wildlife species have been observed or are expected as a result of deer hunting activities.

3. Changes in Public Use/Recreation

a. Hunting

No changes in the current deer hunting strategy are proposed, hence, no changes in deer hunting public use/recreation are expected beyond more complete utilization of available tags. No changes in other hunting public use/recreation have been observed or are expected as a result of deer hunting activities.

b. Nonconsumptive

No changes in the current nonconsumptive public use/recreation have been observed or are expected as a result of deer hunting activities.

c. Nonhunting

No changes in nonhunting public use/recreation have been observed or are expected as a result of deer hunting activities.

4. Effects Upon Human Populations

No changes regarding effects upon human populations, specifically regarding housing, transportation, public services, energy, human health, aesthetics or cultural resources, have been observed or are expected as a result of deer hunting activities.

D. Range Landownership

An estimated 70% of the burro deer range is publicly owned. A large majority of the remaining private lands are utilized for agriculture. Range landownership and use as it relates to burro deer has not changed significantly since the 1984 burro deer herd plan was completed, except with regard to habitat losses to lands designated for cyanide heap leach mining operations. Losses of habitat to this type of mining can be expected to continue. Urban growth in areas of private landownership can also be expected to continue. This urban growth is not expected to significantly impact deer habitat directly in the near future, however, activities of a growing urban population on adjacent public lands may have an impact on deer utilizing those habitats.

Reference: Celantano and Garcia, 1984

Thompson, 1989b

E. Range Vegetation

Due to mild climatic conditions of recent years burro deer range vegetation has been fairly productive and is likely the prime factor in the relatively high population numbers currently experienced by the deer herd.

1. Fire

Vegetation of Colorado Desert habitats is sparse and wildfires do not generally occur in this area. An exception to this can be seen on the Colorado River were dense stands of riparian vegetation, important summer range for a majority of burro deer, occasionally burn. Since the completion of the 1984 burro deer plan two large fires have occurred along the river. The Goose Flats fire in 1988 burned approximately 200 acres and the Ferguson Lake fire in 1989 burned approximately 800 acres on the California side of the river. Habitat restoration work is underway at Goose Flats, south of Blythe, and currently no habitat restoration is planned for the Ferguson Lake area, north of Winterhaven. No control burns have been pursued within the unit.

Reference: Thompson, 1989b

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State of California - Department of Fish and Game. 1989. 1988 Final Deer Take Report. CDFG report.

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Thompson, J.R.. 1989b. CEQA Compliance Preparation - Habitat Report, Lower Colorado River Unit. CDFG/Region 5 report.

Appendix B

Burro Deer Herd

Annual Report Form

Burro Deer Herd
Annual Report

Prepared by: _____ Date : _____

I. Herd Data

A. Composition

1. Surveys Conducted: yes __ no __ (if yes N= ___)
____ Bucks:100 Does
____ Fawns: 100 Does

A. Harvest

1. a) total bucks reported taken ____
b) probable total bucks taken (if different than reported) ____

2. a) age class of bucks taken: 1 __ /2 __ /3 __ /4 __ /5 __ /other ___ /___
b) antler points (high side) of bucks taken: 2 __ /3 __ /4 __ /5 __

B. Nonharvest Mortality

1. Total nonharvest mortality reported ____
Subtotals: canal related ____
poaching related ___
other (note cause if known) ___

II. Habitat

A. General

1. Climatic Conditions

Precipitation: _____ inches Location:

Other Factors:

2. Forage Production:

A. Summer Range (Riparian)

1. Significant Changes:

B. Winter Range (Desert Upland)

1. Significant Changes:

III. Research

A. Herd Data

1. Research Conducted:

B. Habitat Productivity/Utilization

1. Research Conducted:

Please copy Jim Davis
Ken Mayer WMD
& Files
Thanks
Sitton

State of California

The Resource Agency

MEMORANDUM

TO: F. Worthley
Regional Manager - Region 5

DATE: October 3, 1990

FROM: Department of Fish and Game
Lower Colorado River Unit Manager

SUBJECT: Coachella Canal Deer Entrapment Report - 1990

Recent rains throughout the desert areas of eastern Imperial County have signaled the end of the Coachella Canal deer entrapment season. A possible total of 4 deaths (3 confirmed, 1 reported live but not located and presumed dead) occurred between June 26 and July 10, 1990. No rescues occurred.

Rocky Thompson

Rocky Thompson
Wildlife Biologist

cc: Bleich
Sitton

State of California

DAVIS
The Resources Agency

Memorandum

To : Wildlife Management Supervisor, Region 5

Date : September 22, 1987

From : Department of Fish and Game --Upper Colorado River Unit Manager

Subject: Burro Deer Plan Update

During 1986, no biological sampling was conducted in the Upper Colorado River Unit portion of the D-12 deer hunt zone. One adit was constructed and a series of check dams installed in the Hills Ranch area of the Big Maria Mountains to benefit deer.

I. Biological Information

A. Harvest

	1985	1986
D-12	26	46
N. of Interstate 10	2	6

II. Habitat Improvement Projects

One adit was constructed in the Hills Ranch area of the Big Maria Mountains using Bureau of Reclamation monies as mitigation for quarrying activities along the River. It has been shown that deer will summer in some desert mountain ranges if dependable water is available. Insufficient precipitation this year has caused this installation to remain inoperable.

A series of four check dams was constructed in an adjacent area using the same funding sources. The purpose is to temporarily hold runoff, deposit additional soil, and increase both number and diversity of cover and forage elements.

III. Other changes to the Burro Deer Plan

None recommended at this time.

Andy Pauli
Wildlife Biologist

cc: Bleich, Davis

AP:lp

State of California

The Resources Agency

Memorandum

: Wildlife Management Supervisor, Region 5

Date : June 2, 1986

From : Department of Fish and Game —Upper Colorado River Unit Manager

Subject: Burro Deer Herd Plan Update

During the 1985 calendar year, the two wildlife unit manager positions that encompass the burro deer herd area were vacant for a considerable time. Pellet transects were read and cleared six times on five big game guzzlers and three new lunchbox style guzzlers were installed.

I. Pellet transects were read and cleared at the Wiley Well, Chuckwalla, Black Hills, Little Mule, and Cargo Muchacho Big Game Guzzlers. Results indicate no change over previous years counts with most use occurring during Spring and early Summer.

Most of the big game guzzlers listed above are old construction techniques that tend to dry up through use and evaporation during the critical summer months. Members of the Desert Wildlife Unlimited (DWU) believe that by making these water sources more permanent that some deer become resident and do not migrate to the river riparian or canal areas. They have completed two of these projects and have plans for others.

II. During 1985, three additional guzzler installations were completed. These include:

1. Little Mules (lunchbox) - T10S R18E Sect. 17 (SESE)
   1,000 gallons storage

2. Cargo Muchacho (lunchbox) - T14S R20E Sect. 13 (SWSW)
   9,000 gallons storage

3. Mulvation (lunchbox) - 6 mi. south of Little Mules BGG
   20,000 gallons storage

III. No changes recommended to deer herd plan, goals, objectives, or management strategies at this time.

Andy Pauli

Andy Pauli
Wildlife Biologist

APaulp

cc: Bleich, Hein

Call Mayer

State of California — The Resources Agency

M E M O R A N D U M

Date: 23 August 1990

To: Larry W. Sitton
Wildlife Management Supervisor, Region 5

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

Subject: Burro Deer Herd Plan 5 year Update and Supplement

Attached is subject document. Input from past reviews has been incorporated into this version, which should be considered the final draft. Please forward this document, through appropriate channels, to the Wildlife Management Division, for final approval (unless, of course, such approval should be provided by Region 5 management; I'm unsure of the proper protocol).

Please see that copies of the final, approved document are distributed to those individuals listed on R. Thompson's memo of 6 July, as per R. Thompson's memo of 16 August.

By way of a copy of this memo, I am advising Wildlife Management Division of the completion of this document. I'm sure they will be expecting a copy of it in the near future.

Vernon C. Bleich
Associate Wildlife Biologist

cc: R. Thompson
G. Mulcahy
K. Mayer

State of California The Resource Agency

MEMORANDUM

TO: V. Bleich
Field Supervisor

DATE: August 16, 1990

FROM: Department of Fish and Game
Lower Colorado River Unit Manager

SUBJECT: Burro Deer Herd Plan 5 Year Update and Supplement

As stated in the introduction, the Burro Deer Herd Plan 5 Year Update and Supplement has been prepared as an update and supplement to the 1984 D12 deer herd plan, The Burro Deer Herd Management Plan prepared by Robert R. Celentano and Jesus R. Garcia. Included in this report is a summary of herd data from 1984-1989, an evaluation of the 1984 herd plan with regard to past goals and objectives and establishment of goals and objectives for the next five years.

The final draft of the subject document is attached. All comments received have been considered and incorporated as appropriate. The July 6, 1990 memorandum is also attached as a brief summary of the review process to date. Following your review of this draft, please forward it through the proper chain of command. Upon final approval, copies of the document should be sent to the initial reviewing parties (see attached memorandum), in addition any other traditional locations.

Rocky Thompson

Rocky Thompson
Wildlife Biologist

State of California The Resource Agency

MEMORANDUM

TO: Report Reviewers DATE: July 6, 1990

FROM: Department of Fish and Game
Lower Colorado River Unit Manager

SUBJECT: Burro Deer Herd Plan 5 Year Update and Supplement

The Burro Deer Herd Plan Five Year Update and Supplement is attached for your review and comments. As the title suggests this report should be considered as an adjunct to the existing Burro Deer Herd Plan and may require reference to the original plan during your review process.

Limited time and resources may not allow for production of additional copies of this report. So please write out comments and retain this copy for insertion of edited pages at a later date. Comments should be returned directly to me at:

Rt 1 Box 6
Niland, CA 92257
(619)359-0524

It would be appreciated if comments could be returned before July 27. Thank you for your efforts.

Rocky Thompson
Wildlife Biologist

cc: Sitton
Bleich
Mulcahy
Davis ✓
WMD-Sacramento
Brana ✓
Colby ✓
DWU-Lesicka ✓
Imperial Co. F&G Comm.-Rister ✓

IV. Herd Plan

1. Objectives Completed:

2. Suggestions for herd plan amendments:

(Attach or cite pertinent reports)

State of California

The Resources Agency

Memorandum

D Updike

To : Mr. Larry Sitton, Region 5

Date : December 11, 1990

From : Department of Fish and Game

Subject : Burro Deer Herd Plan 5 Year Update and Supplement

I have enclosed comments on the Burro deer herd plan update provided by my staff. These comments are relatively straightforward and should be easy to incorporate.

As we have discussed in the past I feel that a major herd plan update is much more useful if it is incorporated directly into the plan rather than provided as a supplement. Understanding the significance of an extensive supplement requires the reader to possess both the original plan and the supplement as extensive references are made to the original plan in the update. Another reason for updating the herd plan itself is to eliminate the inevitable redundancy that occurs when attempting to create a supplement that will, to some extent, stand alone.

Please have Mr. Rocky Thompson contact Mr. Doug Updike at (916) 322-0313, if he has questions regarding comments on the supplement or the process of transferring the herd plan to diskette.

COPY ORIGINAL STORED BY KEN MAYER

Kenneth E. Mayer
Deer Program Coordinator

Enclosure

cc: Mr. Doug Updike, Wildlife Management Division

EAST MOJAVE DEER HERD PLAN UPDATE
1993

To my knowledge, the East Mojave Deer Herd Plan has not been signed off on at this time, but additional biological information has been gathered since the draft was submitted in 1991 and the 1992 herd plan update. This has included car counts to determine hunter pressure, figures on hunter kill and success, and composition count data from hunter interviews. The East Mojave herd continues to be the only deer population in zone D-17, where 500 tags are available. Hunter success was 9.4% in 1993, with 47 deer tags returned. Age structure was not available at the time of this report.

EAST MOJAVE DEER HERD ANTLER DEVELOPMENT

Year	2 pt.	(%)	3 pt.	(%)	4 pt.+	(%)	Total
1989	9	(31)	17	(59)	3	(10)	29
1990	7	(27)	14	(54)	5	(19)	26
1991	13	(46)	6	(21)	9	(32)	31(+3?)
1992	16	(42)	16	(42)	6	(16)	38(+7?)
1993	18	(42)	19	(44)	6	(14)	43(+4?)

COMPOSITION COUNT INFORMATION

Generated through hunter interviews

Year	Hunters Contacted	Antlerless	Bucks	(per 100 A)	Total
1990	103	44	12	(27.3)	56
1991	98	41	16	(39.0)	57
1992	171	159	40	(25.2)	199
1993	123	114	36	(31.6)	150

Only two unclassified deer were seen in the Clark Mountains during the annual mountain sheep surveys.

CAR COUNT FROM NEW YORK-PROVIDENCE (OPENING DAY)

1990	1991	1992	1993
97	88	98	98

There were no habitat improvement projects to benefit deer completed during the past year.

D-12 DEER HERD PLAN UPDATE
1993/1994

Summary:

Hunter pressure and success for this herd (D-12) have remained relatively constant. Tag quotas of available deer tags for zone D-12 was 1100 for the 1993 hunting season with all available tags being sold. 64 bucks were harvested according to tags returned, but the total should reflect that 75 known bucks were actually taken in this zone, for an 8% success rate.

Herd Condition:

Overall the D-12 deer herd appears to be in good condition. Hunters reported harvested animals to be in excellent condition with ample body fat reserves.

Harvest Data:

Teeth were collected from 53+ animals, but as of this date these samples have not been sent in for analysis.

A: Antler Development

2 pt	(%)	3 pt	(%)	4 pt	(%)	Unknown	(%)	Total
21	28%	26	35%	15	20%	13	17%	75

Composition:

Various methods including hunter surveys, vehicle route counts, and aerial surveys including both fixed wing and helicopter aircraft were attempted with limited success. No conclusive results were obtained.

Habitat Improvement:

3 water developments were constructed within the zone. These being Mount Burro tank - 1500 gallons, McGruder Tank - 12500 gallons, and Knob Tank - 12500 gallons.

Other Changes:

No other changes to the D-12 Herd Plan were implemented.

cc: Unit Files
Bleich
Reese
Schaefer

D-12 DEER HERD PLAN UPDATE Burro
July 1994 thru June 1995

Summary:

Hunter pressure and success for this herd (D-12) have remained relatively constant. Tag quotas of available deer tags for zone D-12 was 1100 for the 1994 hunting season, with all available tags being sold. 65 bucks were harvested according to tags returned, but the total should reflect approximately 75 known, or suspected bucks were were actually taken from this zone. Hunter success rate was 7%.

Herd Condition:

Overall the D-12 deer herd appears to be in good condition. Hunters reported harvested animals to be in excellent condition with ample body fat reserves. Necropsied animals also reveal the same results.

Harvest Data:

Teeth were collected from 50+ animals, but as of this date analysis results for these samples have not been returned for inclusion in this report.

A: Antler Development

See attached D-12 Antler Analysis

Composition:

A new hunter survey form was developed and mailed out with tag purchases for the 1994 hunting season. See attached analysis for this data. Traditional route counts were not attempted for this reporting period.

Habitat Improvement:

1 water development was constructed within the zone. Located in Vinegra Wash, and known as 17 Quail Tank this drinker has a 10,000 gallon capacity. Legals are Township 11S, Range 20E, Section 36SW/SW (Latitude 33 10 09, Longitude 114 49 26).

Other Changes:

A D-12 Action plan was developed to provide the basic framework for the development and implementaion of data gathering programs in the D-12 deer zone.

Gerald P. Mulcahy
Associate Wildlife Biologist

cc: Unit Files
Bleich
Massie
Schaefer
Andrews

M E M O R A N D U M

The Resources Agency

Date: 6 June 1995

To: Mr. Gerald Mulcahy, Upper Colorado River Unit Manager

Ms. Nancy Andrew, Lower Colorado River Unit Manager

From : Department of Fish and Game - Eastern Units Supervisor

Subject: D-12 Antler Analysis

I have completed my analysis of the mean number of antler points/deer, based on the latest statistics for the 1994 season provided today by Mr. G. Mulcahy. Using Analysis of Variance (ANOVA), no differences were detected during 1990 - 1994 in the mean number of antler points for deer harvested in Zone D-12. Although the mean number of points declined slightly from 1990-1993, it jumped somewhat in 1994 (Figure 1). Antler data met the assumptions of ANOVA (homogeneity of variances), and sample sizes were adequate to yield a substantially powerful test. Age data are not yet available for the 1993 or 1994 hunting seasons.

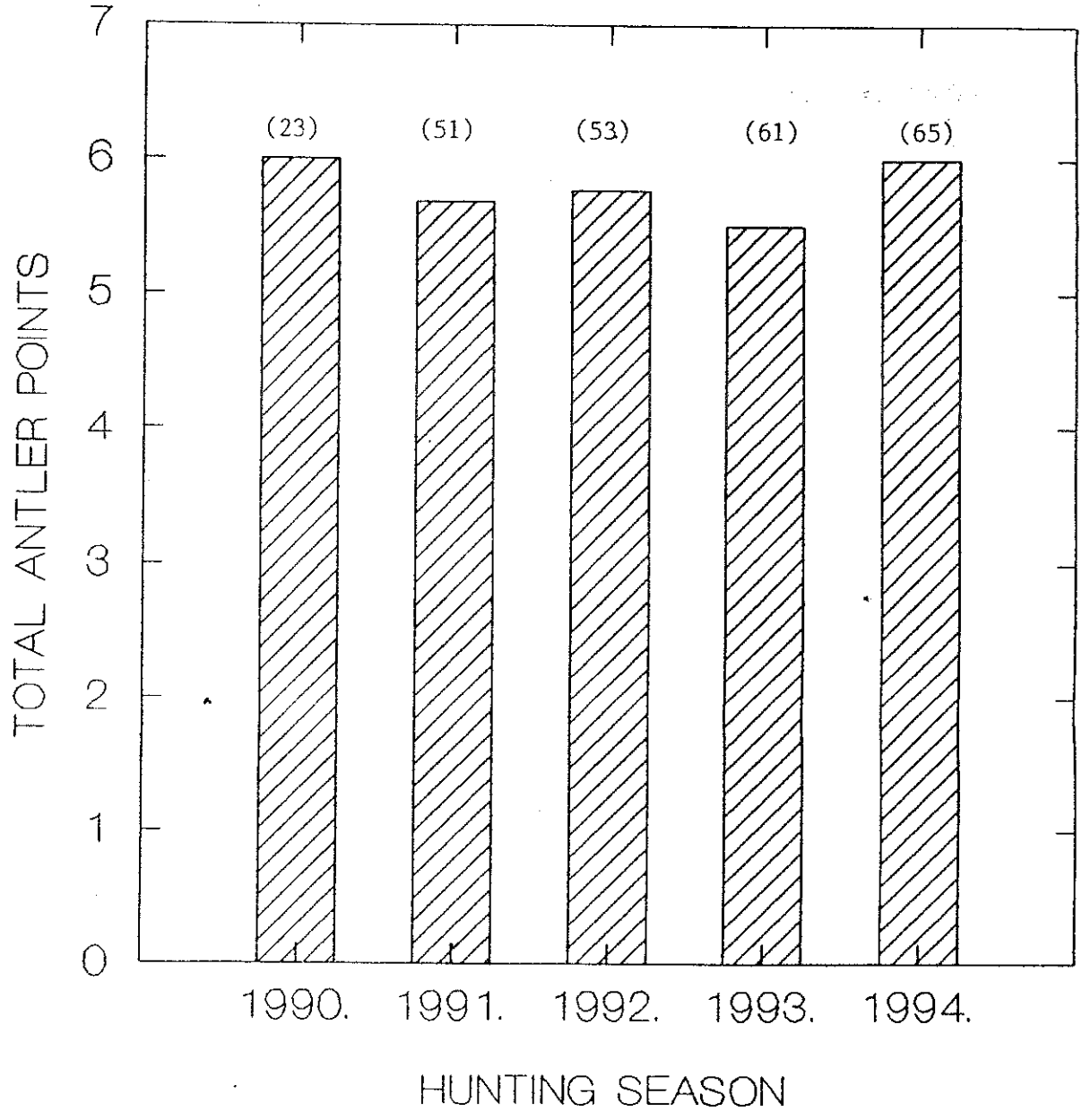
Based on total antler points, there is no indication that the rate of harvest in Zone D-12 is resulting in fewer large males in the bag. Of course, differences in annual rainfall (and resultant forage quality and availability) could affect antler quality, but such cannot be controlled for without additional information not available to me at this time.

Please share this information with interested parties, as appropriate. Thank you for your interest in the D-12 Deer Herd, and for your strong support of this important resource.

Vernon C. Bleich, Ph.D.
Senior Wildlife Biologist

cc: Lt. J. Brana
Mr. B. Schaefer
Mr. J. Davis
Mr. J. Massie
Mr. L. Lesicka (DWU)
Mr. L. Sitton
Ms. P. Wolf

Figure 1. Mean number of antler points for mule deer harvested in zone D-12, 1990-94. Sample sizes (N) are shown above each bar in the histogram. (F=0.771, df=4,248, P=0.545). (File = D12pts.sys).



State of California The Resource Agency

MEMORANDUM

To: John Massie Date: August 27, 1995

From: Nancy G. Andrew

Subject: Summary of 1994 D-12 Deer Hunter Survey

Attached please find the results of the D-12 Deer Hunter survey for 1994. I received the surveys in August from WDM in Sacramento via you, and was instructed to summarize the responses immediately. I received no instructions as to how the information should be tabulated or what statistics should be compiled. Therefore, the results are in the form of raw data with a range and mean statistic provided for a few of the questions. I have faxed a copy of these results to Mr. Sonke Mastrup in Sacramento, as you requested.

cc Gerald Mulcahy
Sonke Mastrup (WMD)

General Survey Information

Re: 1994 D-12 Hunter Survey

1.	Total number of surveys provided for analysis	90
2.	Surveys with information from only one hunt area	
	Area I	1
	Area II	0
	Area III	46
	Area IV	15
3.	Surveys including data from 2 or more hunt areas	
	Area I & III	4
	Area I, III, & IV	1
	Area II & III	1
	Area III & IV	10
4.	Surveys returned but could not be used	3
5.	Surveys returned by D-12 tag holder but who did not hunt	9
6.	Survey returned in which a buck was harvested	11

RESULTS

QUESTION	Area I	Area II	Area III	Area IV
Did you hunt D-12? (# of Yes responses)	7	1	61	26
Did you purchase 1 or 2 tags?				
1 Tag	7	1	59	25
2 Tags	0	0	2	1
How many days did you hunt?				
Total days	9	0	226.5	84.5
Range of days	1-4	-	1-14	.5-16
Mean days per ind.	2.1	-	4.9	4.0
How many hours, on average, did you hunt?				
Total hrs.	55	6	433	180
Range of hrs.	4-12	-	2-12	3-10
Mean hrs. per ind.	7.85	-	7.59	7.2
Number of deer seen.				
Bucks	0	0	78	24
Does	14	0	520	152
Fawns	1	0	143	46
Did you kill one buck? (# of yes responses)	0	0	8	3
Did you kill 2 bucks? (# of yes responses)	0	0	0	0
Number of points Rt/Lt.				
Range of pts.	-	-	2-5/2-5	2-3/3-4
Mean # pts.	-	-	3.87/3.87	2.6/3.3
Circumference of antler Rt./Lt. (in inches)				
Range	-	-	2.5-5/2.5/5	1.2-4/1.2-4
Mean	-	-	4.2/4.2	2.4/2.4
Est. field dressed weight of deer (lbs)				
Range wt.	-	-	120-200	100-125
Mean wt.	-	-	168	114
Number of wounded deer not retrieved.	0	0	0	0

EAST MOJAVE DEER HERD PLAN UPDATE
1995

To my knowledge, the East Mojave Deer Herd Plan has not been signed off on at this time, but additional biological information has been gathered since the draft was submitted in 1991 and the 1992 and 1993 herd plan updates. This has included car counts to determine hunter pressure, figures on hunter kill and success, and composition count data from hunter interviews. The East Mojave herd continues to be the only deer population in zone D-17, where 500 tags are available. Hunter success was 7.2% in 1994, with 36 deer tags returned. Age structure was not available at the time of this report.

EAST MOJAVE DEER HERD ANTLER DEVELOPMENT

Year	2 pt.	(%)	3 pt.	(%)	4 pt.+	(%)	Total
1990	7	(27)	14	(54)	5	(19)	26
1991	13	(46)	6	(21)	9	(32)	31(+3?)
1992	16	(42)	16	(42)	6	(16)	38(+7?)
1993	18	(42)	19	(44)	6	(14)	43(+4?)
1994	18	(50)	12	(33)	6	(17)	36

COMPOSITION COUNT INFORMATION

Generated through hunter interviews

Year	Hunters Contacted	Antlerless	Bucks	(per 100 A)	Total
1990	103	44	12	(27.3)	56
1991	98	41	16	(39.0)	57
1992	171	159	40	(25.2)	199
1993	123	114	36	(31.6)	150
1994	105	121	30	(24.8)	151

Only six does, two bucks, and two fawns were seen during anuual aerial mountain sheep surveys of the Clark and Kingston Mountain Ranges during 1994.

AERIAL CAR COUNT INFORMATION FOR D-17

1990	1991	1992	1993	1994
111	109	114	122	127

There were no habitat improvement projects to benefit deer completed during the past year.

State of California **The Resource Agency**

M E M O R A N D U M **Date:** Aug. 8, 1995

To: Bureau of Land Management
Needles Resource Area
101 W. Spike Road
Needles, CA 92363

Attn: Richard Fagan, Area Manager

From: Department of Fish and Game- Desert Unit Manager

Subject: 1994 Buck Kill-Northeastern San Bernardino Co. (D-17)

Date of Kill	Antler Pts L/R		Reported Location of Kill
10/08/94	1	2	.25 mi. S. Table Top Mtn.
10/08/94	3	2	N. Face Mescal Mtns.
10/08/94	2	3	Mescal Mtns.
10/08/94	2	4	.5 E. Teutonia Pk.
10/08/94	2	2	Clark Mtn.
10/08/94	2	2	Sagamore Cyn.
10/09/94	3	3	Caruthers Cyn.
10/09/94	2	2	Mescal Mtns.
10/10/94	1	2	Table Top Mtn.
10/10/94	2	2	3 mi. E. Midhills Camp
10/11/94	4	4	Bathtub Spr.
10/11/94	2	2	Bathtub Spr.
10/11/94	2	2	Midhills
10/11/94	4	4	New York Mtns.
10/11/94	4	4	Mescal Mtns.
10/11/94	3	3	4 mi. E. Midhills Camp
10/12/94	2	2	Mescal Mtns.
10/14/94	4	5	Castle Mtns.
10/14/94	3	3	Rock Spr.
10/16/94	4	3	5 mi. NW. Junc. Hwys. 62 & 177
10/16/94	3	3	Keyston Cyn.
10/16/94	3	3	Midhills
10/16/94	3	3	Kelbaker & I-40
10/16/94	1	2	Clark Mtn.
10/19/94	3	3	Midhills
10/20/94	2	2	Midhills
10/22/94	3	3	N. of Table Top Mtn.
10/22/94	2	2	Cedar Cyn.
10/23/94	2	2	Midhills
10/23/94	3	3	Midhills
10/23/94	2	2	Summit Spr. Providence Mtns.
10/27/94	2	2	4 mi. NE. Morning Star Mine
10/28/94	2	2	Horse Thief Sprs.
10/28/94	2	3	Colosseum Mine Rd.

Date of Kill	Antler Pts L/R		Reported Location of Kill
10/30/94	2	1	New York Mtns.
10/30/94	2	2	New York Mtns.

Total 1994 tag returns were 36, down 23% from the 47 tags returned in 1993. Opening weekend made up only 22% of the total kill, down considerably from previous seasons. An aerial car count flown on opening morning showed hunter pressure slightly above the 1993 season.

County of Residence	Successful Hunters	% of Total
San Bernardino	26	72%
Riverside	4	11%
Los Angeles	3	8%
Orange	2	6%
San Diego	1	3%

Year	2pts	%	3pts	%	4pts	%	Total Harvest
1990	7	27	14	54	5	19	26
1991	13	46	6	21	9	32	28 (+3unk)
1992	16	42	16	42	6	16	38 (+7unk)
1993	18	42	19	44	6	14	43 (+4unk)
1994	18	50	12	33	6	17	36

No antlerless hunts have been held in zone D-17 since 1964.

ANDY
Andy Pauli
Associate Wildlife Biologist

cc: V. Bleich
WLM-Region 5
B. Schaefer
Lt. Colby
Wdn. Jackson
Wdn. Davis
Unit file