

The Clear Lake Deer Herd  
Management Plan

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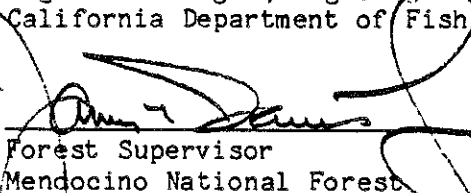


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## I. INTRODUCTION

Deer herds throughout most of California exhibited serious long-term declines during the late 1960's and early 1970's. The Department initiated a program designed to address the problem. A special "blue ribbon" committee was established to examine the situation and make recommendations. Through the efforts of this committee and extensive public input, a statewide strategic plan for California deer was developed in 1976. Emphasis was added to the program by legislative mandate (AB-1521, September 1977). A new Deer Management Policy was subsequently adopted by the Department and the Fish and Game Commission specifying that: (1) planning for deer management be on a herd basis; (2) selected program elements be included in each herd plan; and (3) herd plans generally conform to the goals of the statewide strategic plan.

This document is intended to satisfy the legislative mandate and policy commitment to specifically plan for the management of the Clear Lake deer herd. Organization of the Plan follows a format including: (1) description of the deer population and the physical environment which constitutes its range habitat; (2) management unit goals; (3) problems; (4) management programs, objectives and recommended prescriptions; (5) alternatives; (6) selected references; and (7) an appendix containing supporting information. Since herd plans are dynamic, periodic review and updating are integral parts of the planning process. As additional information is obtained the Plan will be revised as appropriate.

Deer in Lake County are an important resource. The area historically supported one of the highest harvest rates in the State, yet the herd has declined by approximately 60% since the early 1960's (based on harvest data). Popularity of the area for a large number of hunters has remained high, even though actual hunter-use has declined.

## II. DESCRIPTION OF THE DEER HERD MANAGEMENT UNIT

### A. Deer Herd Definition and History

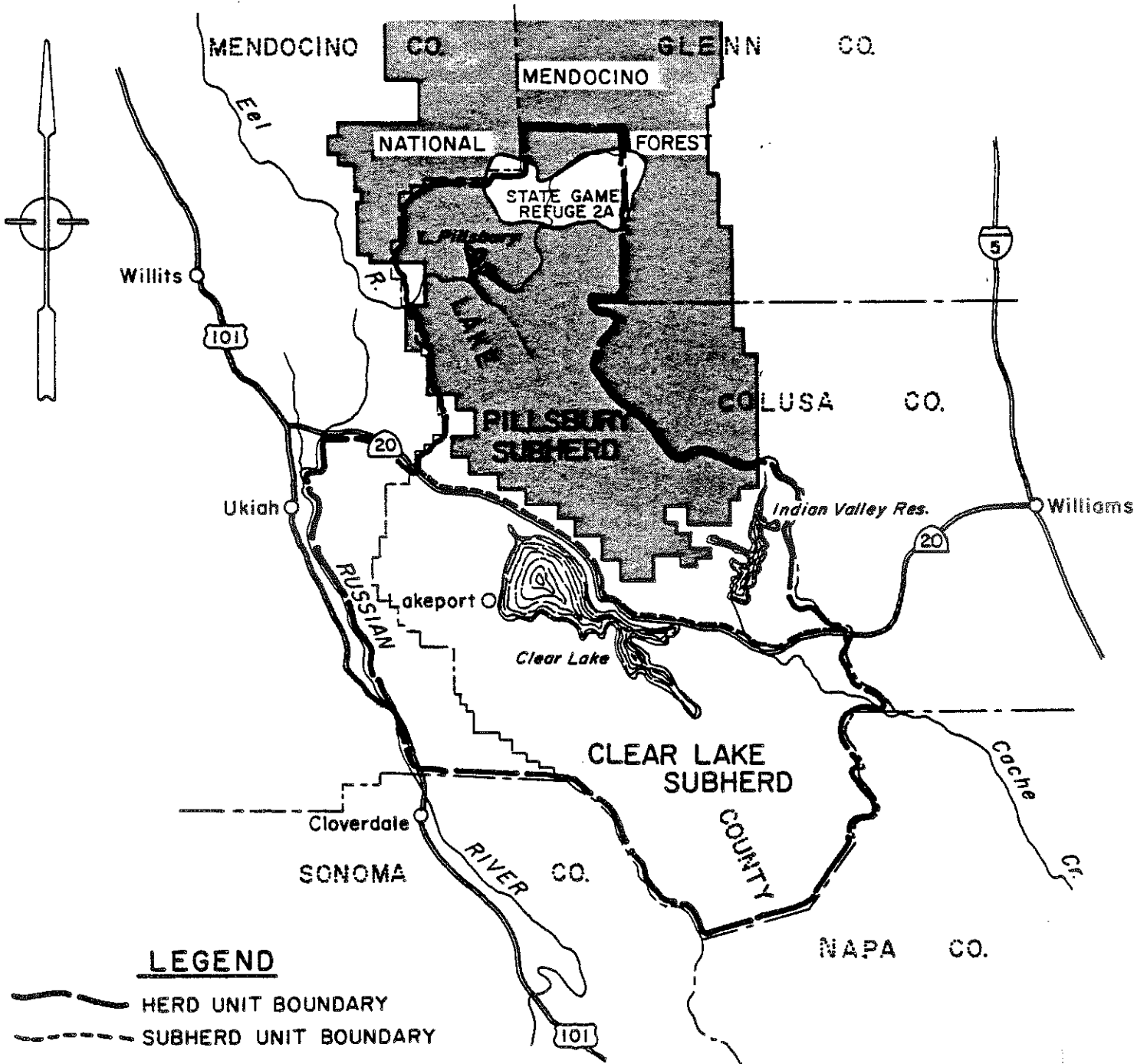
The Clear Lake deer herd is composed of both resident and migratory Columbian black-tailed deer (Odocoileus hemionus columbianus) inhabiting Lake and the extreme southeastern portion of Mendocino counties. Although some interchange of deer occurs across other county boundaries, a practical definition of the herd corresponds to the limits of Lake County plus that portion of Mendocino County which lies south of Highway 20 and east of the Russian River. The herd is subdivided into two distinct subherds based partially on ecological characteristics but also in response to land management (administrative) considerations. The herd unit and subherds are illustrated in Figures 1 and 2. In general, the two subherds correspond to the Clear Lake and Lake Pillsbury herds described by Longhurst et al. (1952). State Highway 20 approximates the east-west boundary between the subherds.

Inhabiting an area of approximately 669 square miles (428,281 acres), mostly in public ownership, the Pillsbury subherd contains both migratory and a lesser number of resident deer. Seasonal movements of the migratory deer are not as well defined as in the Sierra Nevada Mountains, but occur primarily as downslope shifts in response to snow at higher elevations. These deer share a common summer range with deer which migrate east into Glenn County and northwest into Mendocino County. Deer inhabiting areas immediately north of Highway 20, particularly in the vicinity of the North Fork Cache Creek-Indian Valley Reservoir, are typically resident. The degree of overlap between resident and migratory deer during winter varies considerably depending on annual weather conditions. The major distinction between the two groups of deer is the timing of their breeding and fawning seasons with migratory deer being roughly a month later than resident deer.

The Clear Lake subherd is composed entirely of resident deer occupying an area of approximately 742 square miles (474,880 acres). Inhabiting predominantly private lands at lower elevations, these deer have fairly small home ranges, usually less than one square mile (Taber and Dasmann 1958). In light of this highly resident nature, the relationship of these animals to their local environments vary considerably throughout the subherd.



# CLEAR LAKE DEER HERD MANAGEMENT UNIT





Taber and Dasmann (1958) synthesized an historical account of Lake County deer involving three basic periods: (1) Indian times; (2) white settlement; and (3) recent times. The general trend in deer density appeared to differ in oak woodland and chaparral populations until roughly 1930. Deer in oak woodland areas were fairly abundant (50-55 deer/mi<sup>2</sup>) while chaparral deer were less abundant (< 25 deer/mi<sup>2</sup>) during the Indian period prior to 1855. During the period of white settlement from 1855 to 1910, oak woodland deer declined dramatically and remained at a low density (< 10 deer/mi<sup>2</sup>) as a result of heavy hunting pressure, while brush burning resulted in an increase in the density of chaparral deer (50-75 deer/mi<sup>2</sup>).

From 1910 until about 1966, oak woodland deer increased as a result of protective game laws and irrigated agriculture, which locally increased habitat capacities. Orchard, pasture, and vineyard damage by deer reached a high level by 1950. Deer in chaparral areas declined substantially by 1930, as large scale brush burning was discouraged until 1940. More intensive brush management including prescribed burning and seeding was initiated in the early 1940's resulting in increased deer numbers approximating peak levels (75 deer/mi<sup>2</sup>). Prescribed burning was again discouraged during the late 1960's and 70's, contributing to the lower populations that presently exist. Recent policy changes have resulted in a dramatic increase in use of fire as a management tool.

#### 1. Estimated Herd Size

Longhurst et al. (1952) estimated herd size for the Pillsbury and Clear Lake herds at 17,000 and 26,000, respectively, as of 1947. However, the Clear Lake estimate was derived from a herd area including a slightly larger portion of Mendocino County. Using the method described by Anderson et al. (1974) in modeling the Mendocino County deer population, the average Lake County deer population for the period 1957-1979 is estimated at 50,130. Since migrations are relatively short among migratory deer in the Pillsbury subherd and all other deer are resident, greater emphasis in this Plan is placed on deer density within given habitat types rather than population size, per se. These population estimates are provided only as historical perspective, and are viewed as very general estimates, at best. Taber and Dasmann (1958) provide the most comprehensive account of historical trends in Lake County deer prior to the mid-1950's.

## 2. Herd Composition Data

Deer herd composition data have been collected from both the Pillsbury and Clear Lake subherds since 1958. However, larger samples have traditionally been obtained from the Pillsbury subherd. During the period 1958-1963, the Pillsbury subherd was characterized by mean fall ratios of 36 bucks and 61 fawns per 100 does. The mean spring ratio was 49 fawns per 100 does during this period. Fall ratios were comparable in the Clear Lake subherd, but the mean spring fawn ratio was considerably lower at approximately 27 per 100 does.

Small sample sizes necessitated combining herd composition data from both subherds in recent years. During the period 1970-1979, mean fall herd composition ratios for the entire county were 25 bucks and 53 fawns per 100 does. Mean spring fawn ratio for the period was 41 per 100 does. These ratios indicate a substantial loss of fawns between birth and the fall survey. Taber and Dasmann (1958) documented fawn production rates in three Lake County habitat types which ranged from 71 to 145 fawns per 100 adult does. The upper end of this range can be considered the reproductive potential for these deer.

TABLE 1: LAKE COUNTY HERD COMPOSITION DATA\*\*

\* Sample Size In ( )

\*\*Excludes Mendocino County portion of the Clear Lake Subherd

<u>Year</u>	<u>Fall Ratio/100 does</u>		<u>Spring Ratio/100 does</u>
	Bucks	Fawns	Fawns
1958-1959	49	80(456)	40(759)
1959-1960	46	53(358)	32(501)
1960-1961	18	59(266)	47(553)
1961-1962	20	43(249)	37(442)
1962-1963	49	66(385)	33(874)
1963-1964	21	47(628)	21(805)
1964-1965	22	43(363)	26(297)
1965-1966	14	38(223)	33(420)
1966-1967	31	68(277)	33(497)
1967-1968	20	62(455)	37(305)
1968-1969	25	61(330)	33(403)
1969-1970	24	77	32(249)
1970-1971	20	52(266)	24(137)
1971-1972	20	36	35(329)
1972-1973	17	25(182)	
1973-1974	13	35(299)	43(155)
1974-1975	21	49	
1975-1976	17	53(88)	39(170)
1976-1977			59(179)
1977-1978	32	59(188)	51(191)
1978-1979	34	51(215)	61(152)
1979-1980	47	56(205)	58(174)
1980-1981	27	75(419)	70(690)

### 3. Harvest Data

Harvest data are collected primarily by the use of deer tags which are filled out when a deer is legally killed and mailed to the Department of Fish and Game. The number of tags mailed in constitute the legal reported buck kill. Deer harvest data are only a general index to deer abundance. Factors, such as nonreporting, illegal harvest, changes in hunting pressure, bag limit, timing and length of season, all influence total kill so that kill records are only general indicators of herd trends. Harvest records have been regularly reported since about 1958.

Historically, deer were abundant enough to support unrestricted market hunting for some 50 years. There was no thought given to the natural reproduction of deer until they became scarce around 1910. It was not uncommon for ranchers or farmers, at that time, to stop their labors when they spotted a deer and to pursue it until they killed it (Taber and Dasmann, 1958). The reduction and ever apparent loss of this resource led to the first protective regulations which included "buck only" harvest and increased law enforcement. From 1910 until 1940, deer numbers increased rapidly, especially in oak-woodland areas.

With the expansions of agricultural crops and a major increase in brushland prescribed burning programs in the early 1940's, deer numbers increased dramatically. Peak harvest years for Lake County ran from the late 1940's to mid-1950's, with reported legal kills in excess of 2,000 bucks per year. During this period deer were considered by agricultural interests to be pests. This is a notable shift from the early 1900's situation. Agricultural interests were permitted to kill deer depredated on their crops via the depredation permit system under appropriate regulations. The system continues in effect at the present.

The depredation system appeared to be somewhat effective in reducing local deer numbers when populations were high except in areas where major migration corridors were involved. As populations decreased, the system became more effective in holding deer numbers at low levels.

The Lake County buck kill dropped 22% in 1957, but the decline appears to be related to reductions in hunter pressure, rather than a serious reduction in population. In 1958, the Lake County buck kill dropped an additional 1% and then increased 11% during the next three years. From 1961, the buck harvest declined gradually to a low in 1980. (Figure 3.)

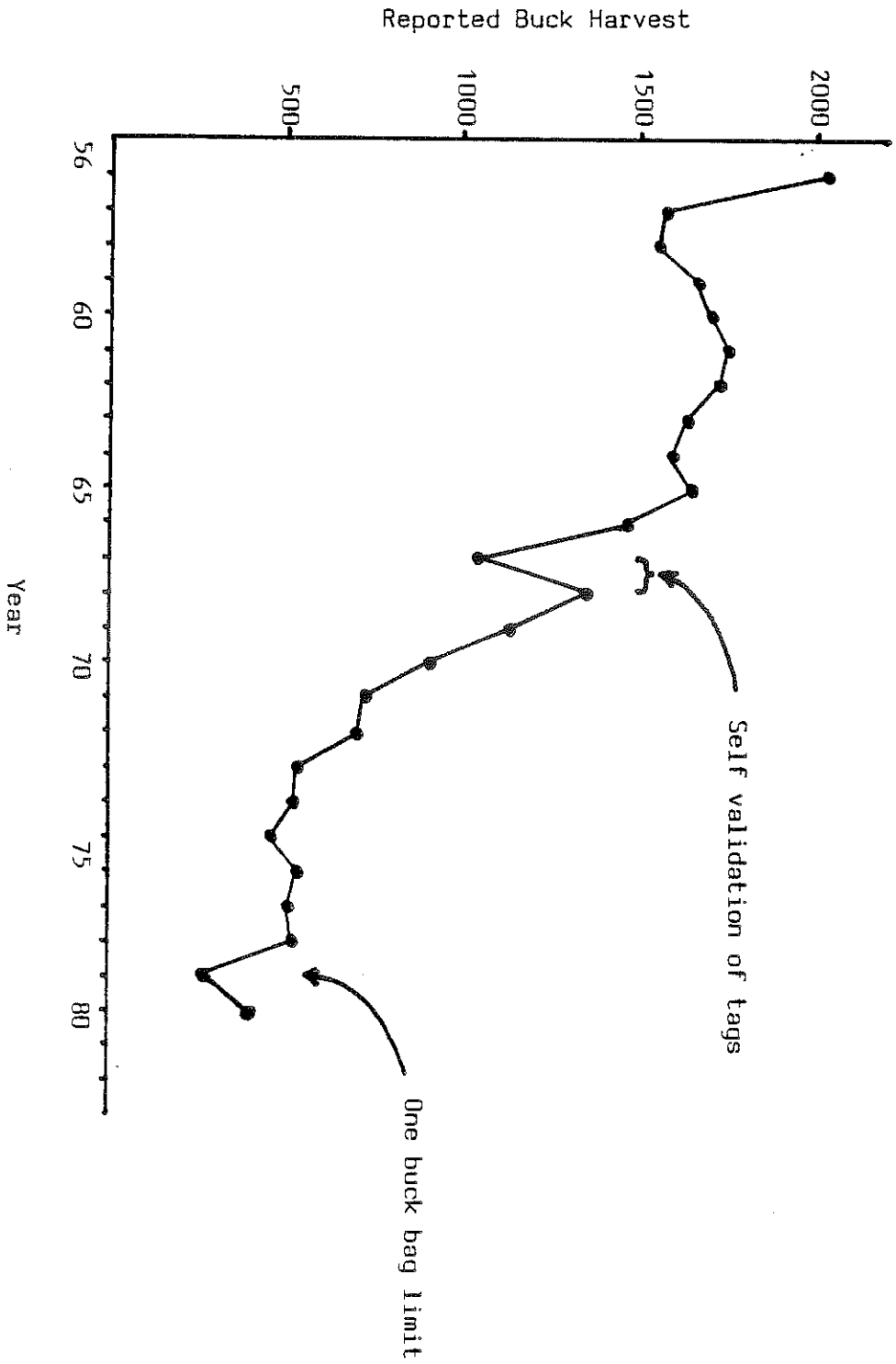


Figure 3 Lake County Buck Harvest 1956-1980 (excluding Mendocino County portion of Clear Lake Subherd)

This same period brought a decrease in prescribed burning, and an increase in fire suppression effectiveness which resulted in higher percentages of old and decadent brush stands with corresponding decreases in deer carrying capacity. As herd numbers steadily decreased, hunter success diminished and are further decreased hunting pressure. This trend continued until 1974 which herd composition counts indicate as the year with the lowest post-season buck carry-over. Drought conditions prevailed in 1976 and 1977, resulting in a slow recovery of the deer population. Since 1978, deer numbers have increased slowly.

In 1976, with the adoption of specific hunting zones for individual herd management, traditional hunting patterns within the two buck bag limit zones were further restricted when hunters had to make choices between local coastal herds and inland herds. This action had no real effect on overall buck kill for Lake County. Both subherd units were placed in the A zone, with traditional early August opening date and a two buck bag limit. Harvest levels remained fairly stable until 1979, when Lake County was placed with Napa County in a new A2 zone with a reduced bag limit of one buck. This action was based primarily on local public concerns and resulted in a 45% decrease in the buck kill (514 in 1978 to 285 in 1979) as the result of further decreased hunting pressure, not buck availability. Many hunters who traditionally hunted two different two deer zones, one of which was Lake County, apparently decided under the one buck bag limit to either hunt the other area or quit hunting altogether.

In 1980, cooperative efforts resulted in the division of Lake County into the two basic subherd units; the Lake Pillsbury Unit (primarily migratory) was placed in the B-1 zone, and the Clear Lake Unit (primarily resident) was returned to the A zone classification. Both zones again have a two buck bag limit. This is a more desirable arrangement for biological and enforcement purposes and forms the basic units for harvest management. Tables 2 and 3 summarize the buck harvest data for Lake County, as well as the harvest from each subherd.

TABLE 2 - LAKE COUNTY REPORTED BUCK KILL 1956-1969

	<u>Total Kill</u>	<u>Clear Lake</u>	<u>Mendocino Forest (Pillsbury)</u>
1956	2030	1426	604
1957	1585	1145	440
1958	1568	1152	416
1959	1684	1269	415
1960	1706	1383	323
1961	1763	1378	385
1962	1720	1343	377
1963	1637	1248	389
1964	1598	1209	391
1965	1658	1182	476
1966	1479	1035	444
1967	1048	684	364
1968	1364	976	388
1969	1131	825	306
	Mean = 1569	Mean = 1161	Mean = 408

TABLE 3 - LAKE COUNTY REPORTED BUCK KILL 1970-1980

	<u>Total Kill</u>	<u>Clear Lake</u>	<u>Mendocino Forest (Pillsbury)</u>
1970	907	594	313
1971	717	497	220
1972	702	407	295
1973	528	300	228
1974	512	305	207
1975	470	264	206
1976	532	271	261
1977	504	247	257
1978	514	230	284
1979	285*	106	179
1980	410	210	200
	Mean = 553	Mean = 312	Mean = 241

\* A-2 zone with 1 buck bag limit.



#### 4. Antler Condition

Comparisons in antler condition between the resident herd and the migratory herd for the year 1978, as reported by tag returns are provided in Table 4. Data from 1979 were not used due to season and bag variations from the historic condition. These comparisons are included to illustrate differences between the predominately public migratory and the mostly private resident subherd units. Only 35% of bucks taken from private lands and 10% from public lands were tagged by Lake County resident. The adjacent Alder Springs deer herd (western Glenn and Colusa counties) had a 1978 harvest of 50% forked horn and a 70% county resident kill (Thornton and Murray 1979).

TABLE 4 - BUCK ANTLER CONDITION AND TAG COUNTY OF RESIDENCE

ANTLER CONDITION

<u>HERD</u>	<u># BUCK</u>	<u>#/%</u>	<u>ANTLER CONDITION</u>							
			2x1	2x2	2x3	3x3	3x4	4x4	4x5	Unk.
Resident	226 *	#	16	148	27	21	4	7	1	2
		%	(7)	(65)	(12)	(9)	(< 2)	(3)	(< 1/2)	(< 1)
Migratory	284	#	20	165	40	35	15	7	0	2
		%	(7)	(58)	(14)	(13)	(5)	(2)	0	(< 1)

\* 4 tags could not be classified.

AREA OF RESIDENCE OF SUCCESSFUL HUNTERS

<u>(CO.) HUNTER RESIDENCE</u>	<u>RESIDENT HERD</u>		<u>MIGRATORY HERD</u>	
	<u>#</u>	<u>%</u>	<u>#</u>	<u>%</u>
Lake Co.	77	35	28	10
Mendocino Co.	11	5	26	9
Sonoma Co.	20	9	17	6
Napa Co.	18	8	4	1
Bay Area	55	25	72	25
Central Valley	39	18	112	39
TOTAL	220 *	100	10	4 No. CA.
			3	2 So. CA.
			10	4 Sierra
			284	100

\* 10 tags could not be classified.

## 5. Breeding and Fawning

The breeding season among resident deer extends from mid-October through November. Some breeding activity occurs in December, but the peak is in mid-November. Fawns are generally born from mid-May through June (Taber and Dasmann 1958). Synchrony of breeding is directly related to nutritional plane of does (Mansfield 1974). Well nourished does tend to conceive on their first estrous cycle and thereby produce the majority of fawns during a short interval in the spring. Migratory deer generally breed up to a month later than resident deer. Breeding activity occurs from late November through December. Fawns are generally born in late June and July. These differences in reproductive phenology are the major factors supporting a later hunting season on the migratory portion of this herd.

### B. Herd Range and History

#### 1. Topography and Land Form

Lake County is within the Interior Coast Range geomorphic province, an area some 400 miles long by 50 miles wide, which is bordered on the west by the Pacific Ocean and on the east by the Great Central Valley of California. It is located in the north-central portion of the Coast Range. The mountain ranges tend northwest with ridges interspersed with long, narrow valleys which is characteristic of this province. Northern and eastern exposures tend toward moister and cooler conditions in contrast with southern and western exposures which tend toward warm and arid environments. Lake County is topographically broken into three distinct Zones: the Mayacamas Mountains along the southwesterly border of the County; the Bartlett Mountains which form a montane border on the northeastern side; and the Clear Lake Basin which separates the two ranges diagonally across the center of the County. The Mayacamas range in elevation from the southern Mt. St. Helena area at 4,343', to Mt. Cobb at 4,722', then gradually descend from 3,661' at Geyser rock to 2,495' at Scotts Creek and 1,551' at the Eel River. North of the Eel River, the range rises again to the northwestern corner of the county near Little Signal Peak at 5,841'.

The Bartlett Mountains in Lake County begin in the southeastern corner near Baldy Mountain at 2,011', and approximate the Lake-Colusa County line along the summit. They extend up Cache Creek ridge at elevation 2,193', Walker Ridge to a point also known as Baldy Mountain at 3,409' above the Little Indian Valley Basin, up Pacific Ridge to Goat Mountain at 6,121'. The elevations continue to rise. North of Goat Mountain are west and east Snow Mountain at 7,040' and 7,056', respectively, Sheetiron Mountain at 6,503', with Glenn County to the east. Hull Mountain forms the northern extent of the range overlooking the Lake Pillsbury Basin from 6,873'.

The Clear Lake Basin contains Clear Lake, the largest natural lake completely within California covering approximately 40,000 surface acres. The lake itself is about seven miles at its widest point and 19 miles long. To the northwest, the basin extends through Blue Lake and Highway 20 to Bachelor Valley where the foothills become steep. To the

southeast, the basin expands into the Cache Creek drainage and rising foothills of the northern Howell Mountains which extend southeasterly into Napa County and the southern end of the Bartlett Mountains.

## 2. Geology and Soils

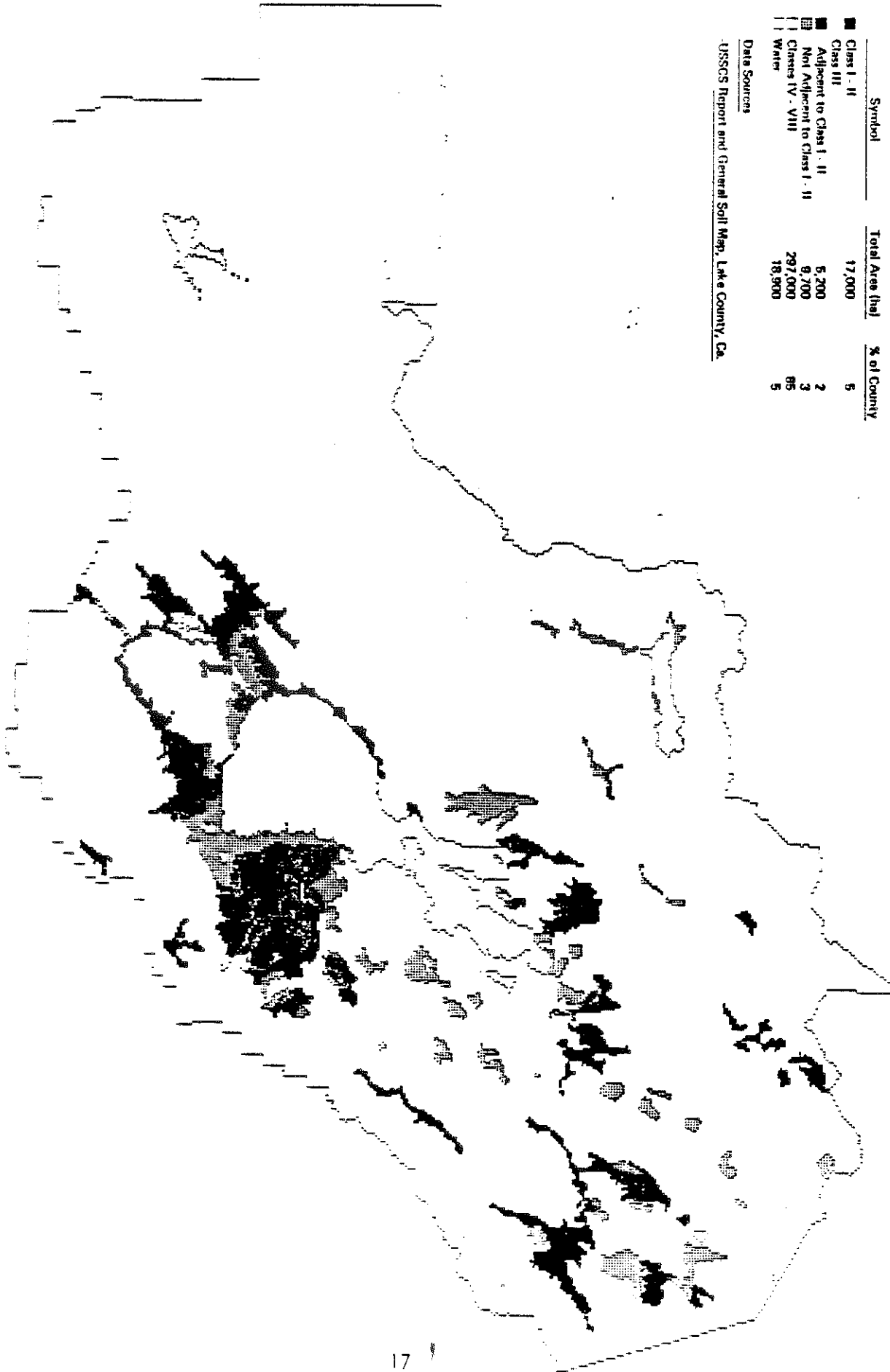
The northwest trending mountain ranges reflect bedrock geology. Bedrock formations are of ancient marine terrace material fractured and mixed then subjected to volcanic and metamorphic conditions. Intense geophysical movements occurred some 10 million years ago between the late cretaceous and middle tertiary periods and resulted in thrust plates which moved along strike-slip and fault blocks with complex folding. During the late tertiary and early quaternary periods there was more folding and repeated faulting and the eruption of the Clear Lake volcanics which has continued into geologically recent times. Mt. Konocti is the most prominent volcano, which stand majestically over Clear Lake. County soils have been generally mapped (U.S. Soil Conservation Service 1980), and are now in the process of more specific revision and update. Some lowland portions which relate to basically agricultural types have been completely mapped.

An agricultural capability map (Figure 4) illustrates the distribution of soil classes. Agricultural soils classed from 1 to 3 (prime to good) represent only about 10% of the county area, and are located primarily in valley basins. The remaining surface area is 85% soils in classes 4-8 and 5% water. Extensive areas of Hennecke (serpentine-based) soil occur within the eastern portion of the County. This soil type is extremely unproductive, almost eliminating improvement potential.

## 3. Climate and Water

Lake County climate is Mediterranean in nature with cool, moist winters, and warm, dry summers. Regional climate affecting the area is governed by its geographic position in the Interior Coast Range, the maritime influence of the Pacific Ocean to the west and the basin air of the great central valley to the east, (Soil Conservation Service 1963).

Figure 4: Agricultural Capability of Lake County



The Coast Range province acts as a barrier to the movement of marine air into the great valley removing the moisture from the air masses as they sweep southeasterly across the country. Rainfall patterns are greater along the coast with up to 60 or more inches a year, and progressively decrease to some 35 inches (plus/minus) entering the great valley basin. Latitude and elevation differences also account for an average rainfall of 28 inches annually at Lakeport and 40 inches at Lake Pillsbury. The rainy season usually begins with the Autumnal Equinox (around September 22), and ends with the Vernal Equinox (around March 21).

Snow is common in elevations above 5,000 feet, however, it generally lasts only a few days at lower elevations. Most of the rainfall drains from the area in rapid runoff. Because of the steep topography and the low porosity of underlying geology in much of the county, most streams are intermittent and perennial streams have extremely low flows by the end of the dry season. Water supplies in the county come basically from storage of surface runoff of some 45,000+ acre feet in Clear Lake, Lake Pillsbury, Indian Valley Reservoir and other minor ponds and reservoirs, as well as groundwater supplies in the alluvial basins that are recharged by percolation from streambeds, rain and underground flow from higher areas. Most domestic and agricultural water is from groundwater sources. Aggregate removal in waterways has in some areas undercut aquifer recharge basins and reduced groundwater levels. This poses serious problems for agriculture, and reduces available green feed for deer by destroying riparian vegetation.

Summer drought conditions are typical for this region with daily temperatures ranging from 75° to 105°F. Average January temperatures are 56°F. maximum with 36°F. minimum, and in July an 88°F. maximum 52°F. minimum. Temperature extremes range from 114°F. in summer to 10°F. in winter. The growing season is generally defined by the period between the last freeze in spring to the first freeze in the fall, and generally lasts for some 215 days in the northern and western parts of the county, and 285 days in the eastern and southern areas.

The relationship between precipitation and heat accumulation have a direct bearing on soil moisture and plant growth. Southern and western slopes receive greater solar input and precipitation than northern and eastern exposures, however, the greater evapotranspiration rates on the former result in warmer and drier overall conditions than on the latter.

#### 4. Habitat

Lake County contains some 803,840 surface acres which can be broken down into 12 basic habitat types (Table 5). Black-tailed deer range throughout the county and utilize many habitats. Of these habitat types, approximately 534,620 acres or about 63 percent of the

county is primary deer range. The most productive deer habitats are oak-woodland areas which adjoin chaparral where deer densities may range as high as 60-100 deer per square mile. In productive chaparral areas, deer densities may reach 30-60 per square mile. Densities range from 10-30 deer per square mile in mixed conifer dominated areas.

TABLE 5 - HABITAT TYPES 1/ AND RELATIVE DEER DENSITY 2/ IN LAKE COUNTY

<u>Habitat Type</u>	<u>Acreage</u>	<u>% County Total</u>	<u>Avg. Deer Density/Mi.<sup>2</sup></u>
Chaparral	244,373	30.5	45
Pine-Fir Forest	207,773	25.8	45
Hardwood	116,800	14.5	80
Woodland Grass	94,150	11.7	80
Grassland	37,800	4.7	20
Minor Conifer	3,000	0.4	20
Marsh	800	0.1	—
Riparian	377	trace	45
Barren	3,950	0.5	—
Lakes/Bays/Reservoirs	45,200	5.6	—
Agriculture	29,031	3.6	45
Urban-Industrial	<u>20,586</u>	2.6	—
	803,840		

1/ (Fish & Wildlife Plan, 1963)

2/ Anderson, et al., 1974



Special deer habitats which are important at least seasonally, include meadows, marshlands, vernal pools and riparian corridors. Meadows with adjacent cover are critical to fawn production and providing succulent forage for spring and summer diets. Riparian corridors also provide important cover elements for deer throughout the year.

Deer are favored by subclimax vegetative conditions. They have also been described as an "edge dependent" species since they spend a good deal of time in and around the edges of plant communities. As a general rule of thumb, the greater the edge and plant species diversity, the greater the carrying capacity for deer. Vegetation protein levels are also highest in young forage plants, and progressively decline as they mature. In some shrub species, i.e., chamise, the decrease in protein content is dramatic, occurring three to five years after a rejuvenating disturbance, such as fire. Habitat quality plays a critical role in determining deer abundance. Management such as prescribed burning, meadow and riparian protection, and water development influence habitat quality.

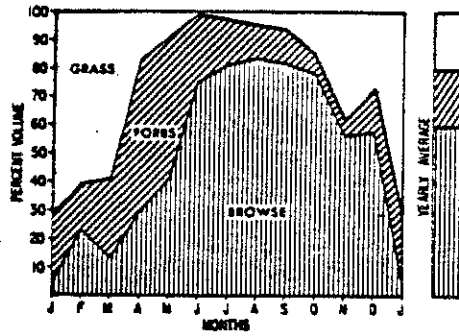
#### 5. Key Deer Forage Species

Adult deer spring and summer diets include nearly equivalent amounts of browse and herbaceous vegetation. In general, fawns are more dependent upon herbaceous vegetation. Major forage classes are given in Figure 5. This information is adequate to demonstrate seasonal food preference in general. However, available food supplies differ each year. Acorns are a preferred food and substitute for other forage classes when available.

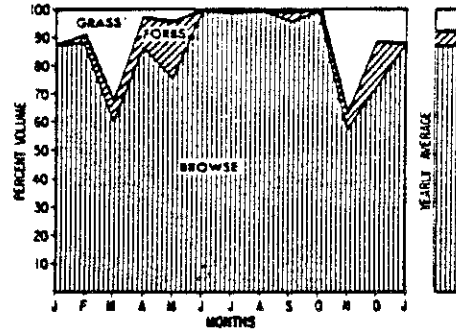
Figure 5: Seasonal Food Habits

204

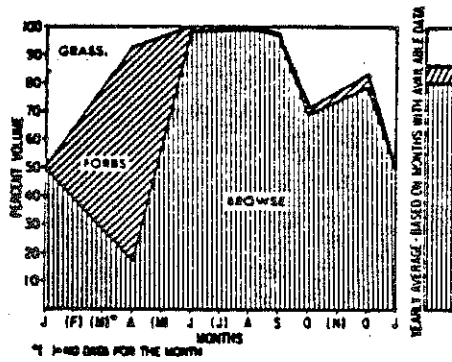
(Longhurst et al.: Food Interrelationships, 1979)



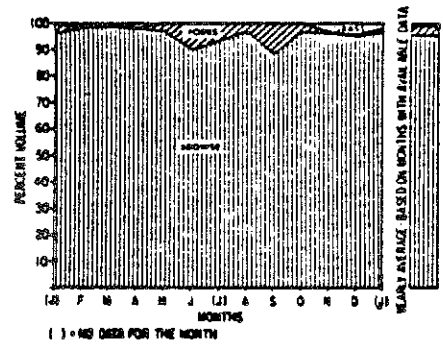
Percent volume of food based on rumen sample analysis. Deer from oak woodland, Hopland Field Station.



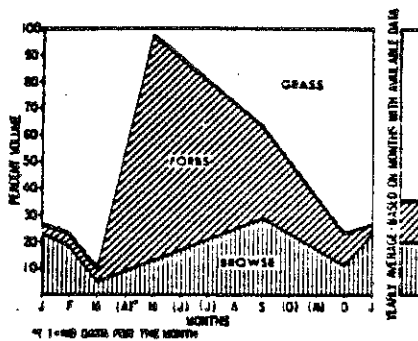
Percent volume of food based on rumen sample analysis. Deer from mixed-age chaparral, Hopland Field Station and adjacent part of the Cow Mountain Recreation Area.



Percent volume of food based on rumen sample analysis. Deer from ecotone between mixed-age chaparral and oak woodland, Hopland Field Station.



Percent volume of food based on rumen sample analysis. Deer from mature chaparral, Cow Mountain Recreation Area.



Percent volume of food based on rumen sample analysis. Deer from Masonite Corporation property.

## 6. Land Use

Land use has been quite variable reflecting the life styles and "needs" of the residents. Concern for wildlife began in the early 1900's, with the establishment of Fish and Game regulations and the creation of National and State Forests to manage timber resources. The county then became a major focal point for recreation, people wanting to hunt, fish, or generally relax in the mountains and Clear Lake Basin. As human population increased and land uses became more complex, initial efforts to establish a fundamental system of land regulation was enacted in 1958, which basically separated the county into four types: residential; commercial; agricultural; and industrial. This initial zoning was instigated by the landowners to protect agricultural and range interests from development for residential and commercial zoning. Agriculture has played an important role in shaping the valley landscapes.

Environmental legislation from both the National Environmental Policy Act of 1969 (NEPA) and California Environmental Quality Act of 1970 (CEQA), directed the counties to prepare long-range management plans for all uses and resources via a General Plan. The Lake County General Plan is still being developed, with a Draft submitted in June, 1980.

Existing land uses are presented in Table 6 Figure 6.

Table 6 - Existing Land Use

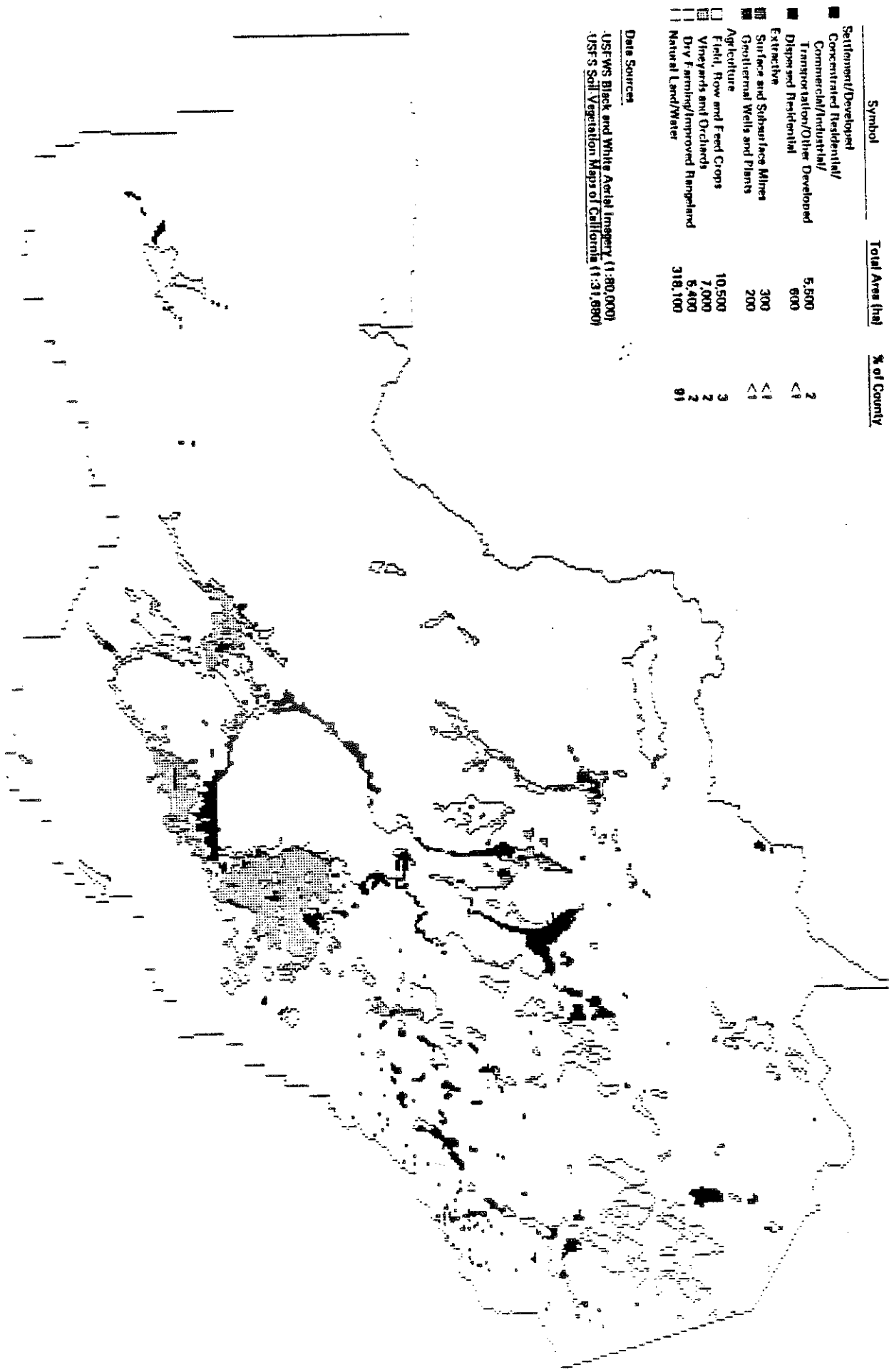
<u>Land Use</u>	<u>Acreage</u>	<u>% of Total Acreage</u>	<u>Parcels</u>	<u>% of Total Parcels</u>
Residential	47,636	5.5	16,776	28.4
Vacant Residential Economic	57,704	6.7	35,524	60.0
Agriculture Unit	150,920	17.6	2,122	3.6
Agriculture Noneconomic Unit (A)	89,206	10.4	920	1.5
Commercial	12,291.00	< .1	30	.1
Governmental (B)	24,855	2.9	324	.5
Institutional	1,172	< .1	78	.1
Recreational	89,187	10.4	766	1.3
Undefined (C)	<u>383,892</u>	44.8	1,253	2.1
	857,330			

(A) Assessor's criteria for noneconomic agriculture land are based on: parcel size, type of product grown and environmental conditions.

(B) Government land use includes: Federal/State and County lands.

(C) Undefined means the Assessor has not assigned more definitive code.

Figure 6- Land Use Categories in Lake County, 1980



Title 14 of the Fish and Game Code assigns management responsibility for deer resource to the Department of Fish and Game. Tables 6 and 7 show that while the State has responsibility for deer management, most Lake County lands are owned by others. Deer management cannot be separated from habitat management and land use which influence habitat conditions for the deer resource.

## 7. Development

Land development in Lake County began in the early 1800's when large land tracts were granted first from early Spanish and then from the U. S. Government. By 1849, most property and parcel lines were random and somewhat obscure.

The Subdivision Map Act of 1907, gave counties broad authority to regulate subdivision, including designs and improvements, required dedication of public improvements or payments of in-lieu fees, and make findings of project consistency with the General Plan or to applicable specific plans. Following World War II there were numerous "paper" subdivisions created which were on excessive slopes, isolated from services, and generally sold to clients who never saw them. There was no real County Plan, at that time. There are still some 35,524 vacant residential parcels because of "paper" subdivisions.

Land divisions greater than five parcels are termed major subdivisions. Major subdivisions and land use changes are currently addressed by environmental impact reports which address land suitability factors and evaluate constraints and conflicts. These reports are circulated for public and private comment and generally guide such development on a project basis. Projects have more recently been modified or denied via these procedures. However, there are still needs for initial studies to determine the feasibility of proposed subdivisions, prior to draft reports.

While most public lands have been managed in terms of resource utilization for timber, recreation, etc., under multiple-use categories, a further refinement is in progress via more specific management plan formulations (Figure 7).

Land development in Lake County has centered around the Clear Lake Basin and upland valleys where interspersions of developed and wild lands are a characteristic of the region. Development patterns have extended into deer habitats adjacent to previously developed areas for the most part. Table 8 depicts subdivision activity since 1941.

TABLE 7  
PUBLIC LANDOWNERSHIP  
TABULATIONS OF PUBLIC LANDS  
(Acres and Parcels)

<u>Government Agency</u>	<u>Acreage</u>	<u>Percent of Total Acreage</u>	<u>Parcels</u>	<u>Percent of Total Parcels</u>
State of California (Boggs Mountain)	3423.261	.8	.12	.6
U.S. Forest Service	247,035.46	60.7	664	33.9
U.S. B.L.M.	123,035.22	30.2	394	20.1
U.S. Government (Other)	8,975.73	2.2	65	3.3
State of California	3,935.67	1.0	56	2.9
County of Lake	2,760.26	.7	372	19.0
School Districts	99.45	< .01	54	2.8
Fire Protection	.27	< .01	29	1.5
Cemetary	29.57	< .01	13	.7
Water Districts	11.00	< .01	56	2.9
Yolo County Flood Control District	6,615.01	.6	15	.8
Reclamation	21.63	< .01	13	.7
Clear Lake Sanitation District	851.36	.2	21	1.1
Pacific Gas & Electric I	6,840.56	1.7	184	9.4
Pacific Gas & Electric II	<u>3,588.40</u>	<u>.9</u>	<u>12</u>	<u>.6</u>
TOTAL	407,463.80	100.0 *	1,961	100.0 *

\* Figures do not add due to rounding.

1. U.S. Coast Guard Facilities, Small Business Administration, and Bureau of Indian Affairs.

Source: Lake County Assessor, List of Government-Owned Property - Computer Printout, June 23, 1980.

See Figure 6

Figure 7: Public Lands Within Lake County

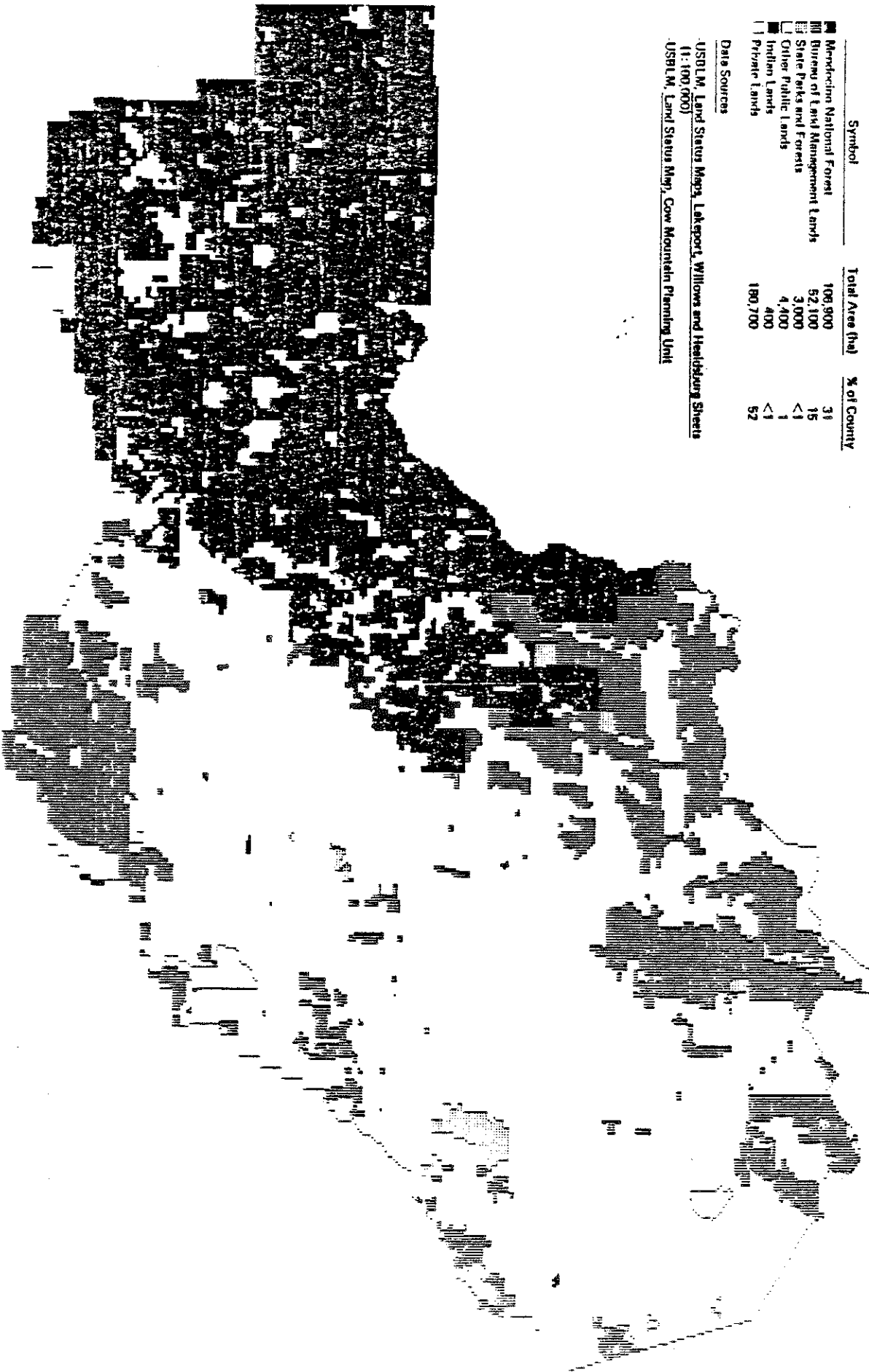




TABLE 8 - LAKE COUNTY SUBDIVISION ACTIVITY, 1941-1979

<u>Major Fiscal Year</u>	<u>Subdivision</u>	<u>Lots</u>	<u>Acres</u>
1941-1942	4	130	356
1942-1943	1	137	10
1943-1944	0	0	0
1944-1945	2	74	70
1945-1946	6	1,087	1,432
1946-1947	6	311	354
1947-1948	1	133	82
1948-1949	4	1,426	338
1949-1950	1	N/A	102
1950-1951	0	0	0
1951-1952	5	146	35
1952-1953	1	82	7
1953-1954	3	77	25
1954-1955	3	183	39
1955-1956	4	98	253
1956-1957	4	464	425
1957-1958	5	342	149
1958-1959	12	653	260
1959-1960	8	1,139	371
1960-1961	8	611	422
1961-1962	10	2,010	516
1962-1963	9	1,526	267
1963-1964	8	762	158
1964-1965	22	2,115	883
1965-1966	25	2,405	790
1966-1967	24	2,965	4,615
1967-1968	18	2,065	3,038
1968-1969	18	7,778	3,193
1969-1970	15	1,976	2,277
1970-1971	7	1,146	398
1971-1972	4	205	2,502
1972-1973	5	141	40
1973-1974	3	226	486
1974-1975	4	152	1,299
1975-1976	8	637	2,810
1976-1977	7	151	1,238
1977-1978	3	76	22
1978-1979	<u>1</u>	<u>23</u>	<u>4</u>
TOTAL	269	33,452	29,264

Source: Ray Dabler, Lake County, Personal Communication, July 17, 1980.

Geothermal development does not require subdivision and is operated as leaseholds within the Known Geothermal Resource Area (KGRA), which is located in the southwesterly quarter of the county. Figure 8 illustrates the geothermal reservoirs within the KGRA.

Development of this resource has, in general, opened up many areas with roads, pads and pipeline corridors, and in some cases, improved conditions in general for deer by setting back plant succession and creating more edge. Controlled burning of chaparral has been requested as mitigation for the loss of habitats and accomplished on a number of leaseholds where deer were the major consideration.

In regard to public access changes in the KGRA development, the lands are mostly private and had little prior public use. During early development years, new roads provided access to the public until they were closed off again in 1978. It is doubtful that public hunting other than under close supervision will ever occur within these geothermal leaseholds while production and maintenance are occurring.

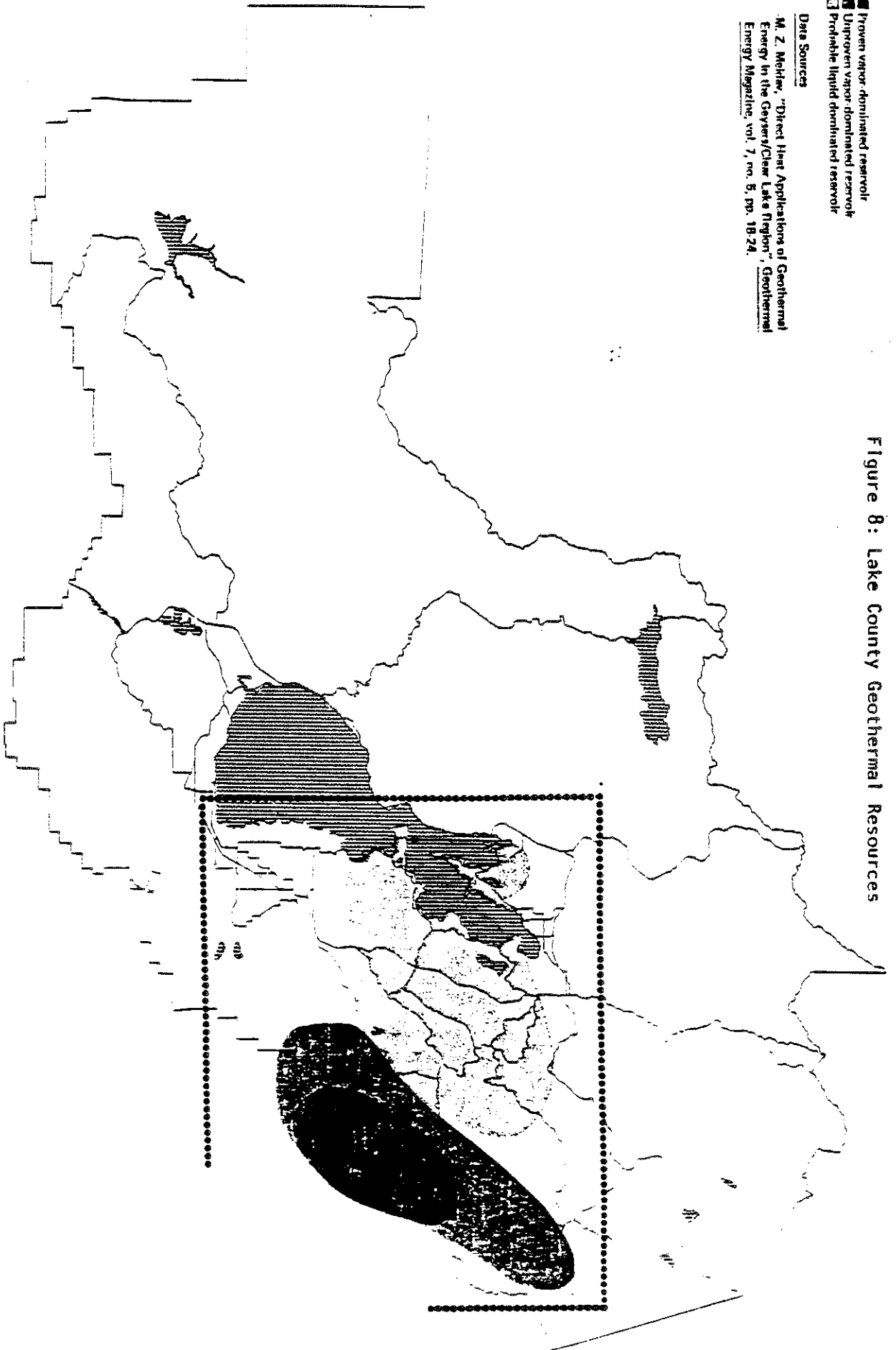
Federal lands leased out to geothermal development, at this time, are mostly on Bureau of Land Management holdings. However, the Mendocino National Forest is preparing an Environmental Analysis to evaluate whether or not to open portions of the Forest to lease.

- Proven vapor-dominated reservoir
- ▨ Unproven vapor-dominated reservoir
- ▤ Probable liquid-dominated reservoir

**Data Sources**

M. Z. Mehlur, "Direct Heat Applications of Geothermal Energy in the Geysers/Clear Lake Region", Geothermal Energy Magazine, vol. 7, no. 5, pp. 18-24.

**Figure 8: Lake County Geothermal Resources**



## 8. Agriculture

Agriculture is limited, for the most part, to fertile soils in major valley areas. Fruit and nut production accounts for more than 75% of the total value of agricultural production. Pears, walnuts, and grapes are the major crops. These occur on Soil Conservation Service soil capability Class 1-3 of prime to moderate classification. Some of these soil types are maintained in permanent pasture and others have been converted to residential development, since they are deep and relatively flat lands.

It is County policy to "preserve and protect the future of agriculture ..., and to enact zoning to protect agricultural lands and their water resources." Agricultural interests have long been a major force behind these county policies.

The impact of agriculture on the deer resource varies by area and the management protection for the crop produced. In general, the agricultural development in major valleys and foothills, and the increased human populations, displaced deer out of valley bottoms and into adjoining uplands. Pears, walnuts, grapes, and other succulent forage attracted deer, and where no deer proof fences were utilized, crop depredation became severe when deer populations were high. Most areas do not utilize fencing to prevent depredation. Since deer populations are currently low, deer depredation is also low but this problem could again arise if deer populations increase. There has been a long history of landowner dissatisfaction regarding the need to harvest deer which they cannot utilize, and the preparation of carcasses for charitable donation, including contacting appropriate authority for timely removal. Many ranchers continue to take depredating deer without going through the permit procedures. No one is completely satisfied with the present system. Biologically, the either-sex harvest via the depredation system poses a potential limiting factor on deer herd increases due to the potential for excess doe harvest in local areas, since depredation permits function essentially as an either-sex hunt.

One major problem generally related to agriculture, specifically viticulture, is the removal of waterway (riparian) vegetation and "clean farming" to the edge of the banks. In most cases, the waterway is the only remaining "wild" habitat, and a major use area for deer and numerous other wildlife.

Conversion of woodlands and chaparral vegetation to grassland has reduced deer habitat productivity in portions of Lake County. While there may be greater forb production for spring deer forage, there is also reduction in escape cover and late summer and fall food crops. In some cases, the valuable edge gained by opening up areas has now been removed entirely by continued conversion.

There are very few rangelands in Lake County where areas critical to deer are protected by internal fencing control. Virtually every waterway, every woodland, every chaparral forage area within a grazing range are open to livestock. There is no protection afforded fawning meadows, riparian escape cover, and passageways, wetland units or oak woodlands.

TABLE 10 - HARVEST OF PUBLIC TIMBER 1952-80

<u>YEAR</u>	<u>Mendocino National Forest</u>		<u>Bureau Land Management</u>	
	<u>MMBF</u>	<u>ACRES CUTOVER</u>	<u>MMBF</u>	<u>ACRES CUTOVER</u>
1952	7.9	1,080		
1953	4.3	800		
1954	0.4	55		
1955	3.6	182		
1956	1.8	264		
1957	15.7	1,097		
1958	20.6	2,211		
1959			1,500	320 (Partial Cut)
1961	7.0			
1962	12.8			
1963	14.2	1,480		
1964	21.0	1,810		
1965	18.7	1,200		
1966	17.7	1,800		
1967	2.1	150		
1968	30.3	2,800		
1969	0.8	75		
1970	28.9	2,500		
1971	25.9	2,450		
1972	12.4	850		
1973	4.2	600		
1974	.2	20		
1975	3.0	200		
1976	5.2	700		
1977	9.4	1,100		
1978	6.2	800		
1979	15.4	1,100		
1980	3.1	300		

## 11. Recreation

Outdoor recreation is a part of the production output from public lands. In general, recreational use has remained fairly constant over the last ten years. However, there have been several important shifts in types of use. Recent trends on National Forest and public domain lands (1970's) have been towards dispersed recreational use (area wide without developments) in contrast to intensive use involving development of campgrounds and other facilities.

A further change involves hunting use which has decreased as deer numbers and hunter success declined in the last ten years. Off-road-vehicle (ORV) use has increased dramatically since the mid-1960's. ORV facilities are being increased on Cow Mountain through the California trail-bike license fee program. Traditionally, a fall-winter pursuit, ORV use has become a year-round recreational activity, including substantial winter increase of 4-wheel drive vehicles both on and off road. The development of Indian Valley Reservoir in the eastern part of the county appears to have increased recreational use in an area which formerly received little pressure. This general area is also being analyzed for various management options, one being for classification to a primary use of ORV recreation by BLM and Forest Service.

## 12. Access

The impact of access on deer is variable depending upon the area, the degree, and the type, varying from more than is needed for hunting in some portions of the Cow Mountain and Mendocino National Forest, to none in other public land units locked in by private holdings. Each set of circumstances, likewise, depends on the habitat types in relation to the access corridor, deer use patterns and utilization level. A comprehensive evaluation of access situations goes beyond the scope of this report, however, there are general trends which can be addressed.

Access corridor design should attempt to go through homogenous habitat conditions and avoid the edges of plant communities. As already discussed, edges are critical elements and breaking of homogenous areas tends to increase edge. Specific and critical edges which should be avoided are meadows, glades, vernal pools, riparian vegetation, and small pockets of mixed habitat types.

In areas with excessive access, there is a greater chance for accident or injury associated with hunting. In areas with too little access, difficulty in harvest control increases. Areas of public lands which are landlocked by private lands tend to become private hunting grounds. This has resulted in trespass across the private lands, and led to animosity between hunters and landowners.

### 13. Fire

As previously mentioned, fire is a vital component in the regeneration of many of the forage species important to deer in Lake County. Protein levels remain high only for a short period and a maintenance of burned areas, on a rotational basis, is essential for maintaining a large deer population. Fire suppression policy, since the 1920's, has been to extinguish all fires at the smallest possible acreage. Such policy led inexorably to old-age stands of vegetation with little diversity which in turn led to increased fuel buildups that supported catastrophic wildfires.

Prescribed burning, an attempt to restore fire to its natural role within the environment, is becoming a more widely used tool. This trend is expected to increase. Tables 11 and 12 provide details of acreages involved. Evaluation of 1980 and 1981 BLM burns on Cow Mountain are underway (U.S. Department of Interior 1980).

TABLE 11 - ACREAGE BURNED BY WILDFIRE IN LAKE COUNTY 1955-79

<u>YEAR</u>	<u>CDF PROTECTION</u> (BLM & Private)	<u>MENDOCINO NATIONAL FOREST</u>
	<u>ACRES</u>	<u>ACRES</u>
1955	3,734	N/A*
1956	1,279	N/A
1957	3,349	N/A
1958	2,076	N/A
1959	13,312	N/A
1960	4,007	40
1961	7,154	40
1962	12,498	600
1963	762	20,000
1964	3,141	2,000
1965	9,378	100
1966	4,214	22,000
1967	3,988	20
1968	825	10
1969	302	0
1970	735	0
1971	3,025	2,100
1972	1,665	0
1973	14,829	23,600
1974	464	5
1975	1,899	150
1976	2,565	30
1977	498	15
1978	750	0
1979	<u>1,721</u>	<u>0</u>
Total Acres	98,170	70,710
Twenty-five year average of acres	3,927	3,535

\* N/A = data not available.



TABLE 12 - CONTROL BURN STATISTICS, LAKE COUNTY

A. CDF (private ownerships) 1949-1978

	<u>Total</u>	<u>30-Yr Avg.</u>	<u>1980</u>
Total No. of Applications	577	19	20
Number of Burns	368	12	15
Acres Burned	66,542	2,218	4,795
Number Escapes	30	1	0
Escape Acres Burned	5,307	177	0
Total Acres Burned	71,849	2,395	4,795

B. Public Ownership

<u>Year</u>	<u>Mendocino National Forest</u> <u>Acreage</u>	<u>Bureau Land Management</u> <u>Acreage</u>
1974	300	---
1975	2,500	---
1976	300	---
1977	600	6,500
1978	500	---
1979	400	---
1980	1,200	4,000
1981	1,000	4,600

#### 14. Tule Elk

Tule elk inhabit two separate areas within Lake County. The Lake Pillsbury Basin was selected in 1977 for tule elk reintroduction to meet legislative mandate to increase California herds to a minimum of 2,000 animals. Replanting began in February 1978 with 13 animals, followed by a second plant in October 1978 of 28 animals. The third major plant of 58 animals occurred in October 1980. Documented mortality to date, is 11 animals and is considered conservative. Losses have been attributed to hunter mistake, poaching and other factors. A minimum of five calves were produced with at least two lost. The breeding population is now estimated at about 80 animals. Areas of use coincide with low human activity levels, preferred sites in the upper Gravelly Valley areas near Smokehouse Creek, Thistle Glade on the Eel River, and at points further away from heavy recreation use. Elk distribution has been widely scattered in small groups ranging in all directions from release sites in the Basin. The last plant of 58 animals was from a single herd unit. Holding pens were utilized on-site for about three weeks prior to release.

The Cache Creek herd was established as a free roaming herd in 1922. It's population averages around 100 animals, apparently held at that level through illegal harvest and livestock competition for riparian feed.

Recent habitat improvement projects have been accomplished by BLM, but have not yet resulted in increased herd numbers. Deer and elk are not anticipated to seriously compete. The 1980 change to a later deer hunting season should be beneficial to the Pillsbury elk herd, since the new hunting will eliminate conflicts with breeding activity.

#### C. SOCIOPOLITICAL ENVIRONMENT

The condition and size of a deer herd reflects the condition of land which provides its habitat. Habitat condition is influenced by the deer themselves, as well as a set of social (tradition, economics etc.), and political (laws, policies, plans, etc.) factors. Private and public lands within Lake County are managed based on these considerations by a large number of private landowners and the following public agencies: Mendocino National Forest; Bureau of Land Management; State Lands Commission, and the Department of Parks and Recreation.

Land use on the National Forest was basically defined by the Multiple-Use Act of 1954, and as specifically set forth in the Upper Lake Ranger District Multiple-Use Plan approved in 1964. The National Forest Management Act of 1976 brought about a new major planning program which will result in a Forest Management Plan in 1983. The Clear Lake Deer Herd Plan is compatible with the Forest Multiple-Use Plan and will provide input for the pending Forest Management Plan.

The Bureau of Land Management administers its land with guidance from the Federal Land Policy and Management Act of 1976. Their land base within Lake County is stable with the exception of infrequent minor land exchanges

with private owners or other public agencies to achieve more efficient management by both parties. Efforts underway which potentially affect deer, include a grazing EIS, wilderness area review, a large-scale boundary adjustment review, and updating of Land Use Management Plan program.

The California Department of Forestry is indirectly involved in deer habitat management in Lake County. Timber management and prescribed burning programs on private lands are regulated by the agency under the authority of the Forest Practices Act and SB 1704 (1980), respectively. In addition, the Department of Forestry is contracted by the Bureau of Land Management to provide fire suppression capability on public domain lands.

Many other Federal, State and local agencies directly or indirectly influence deer and their habitat. Where agency jurisdictions overlap, coordination is generally achieved through Cooperative Agreements between agencies, often under the direction of appointed or elected officials (Resource Conservation Districts, County Board of Supervisors, etc.). A major administrative program presently underway is a revision of the County General Plan. It will guide future use of private ownership, and have a direct influence on the deer resource.

The end of the decade of the 1970's, marked a major turning point in Lake County sociopolitical activities and attitudes regarding deer management and natural resource programs. This period could be termed the advent of cooperative management programs, including County, State, and Federal agencies in conjunction with private groups and individuals. Former attitudes of "each on their own" were replaced by "let's work together."

Initial cooperation involved a prescribed brush burning program on BLM and Forest lands to improve deer habitat and reduce fuel loads. It utilized the relatively new helitorch technique to economically and effectively treat selected areas. The program has been extremely successful and allowed a high degree of interaction between public agencies, private individuals, and groups. Program goals are being achieved via cooperative efforts.

Another positive influence was the creation of a County Fish and Wildlife Advisory Board in 1979. The body was established to coordinate and direct input into natural resource programs. The board is composed of a diverse group representing local interests, as well as State and Federal agencies. Recently, this body was instrumental in refining deer management by supporting hunting season and zone boundary changes based on biological evidence regarding differences between subherds.

### III. MAJOR FACTORS REGULATING THE POPULATION

There are many factors which influence deer numbers in Lake County. Some factors (recreation and green feed production) tend to be of seasonal influence. Others, such as fire, livestock grazing, and logging, operate over longer cycles. Changes in land use, such as urban and industrial development, represent "permanent" changes.

Throughout the variety of vegetation types and land uses the factors regulating deer numbers occur in infinite combinations and vary widely from area to area. For this reason, successful overall deer herd management will depend upon specific programs which use the direction of this Plan to guide management activities.

#### A. Habitat Condition

A lack of nutritional forage on all seasonal ranges is the primary factor limiting the productivity of deer in Lake County. The conditions controlling this habitat quality are weather patterns, vegetation age, composition, and land use (Taber and Dasmann 1958; Longhurst et al 1976).

##### 1. Weather

Weather patterns of precipitation and solar illumination determine annual growing season, relative growth rates and long-range growth cycles. Numerous scattered rainy periods tend to promote greater vegetative response than do fewer showers with greater water volume. Late spring and early summer rains, while not common for the area tend to retard the average early summer dry-out and provide more green feed for fawn survival. Summer drought conditions tend to occur during the spotted fawn stage when fawn dependency on green feed is high. Surface water availability decreases rapidly, once the dry-out begins.

The summer drought condition is thought to be responsible for the major loss of fawns from Lake County herds as late summer is the period of greatest nutritional stress for deer. This factor, coupled with major alterations in waterways from livestock grazing and agriculture, and the reduction in surface water flows from overmature vegetation communities, are responsible for major reductions in nutritional forage in key wildlife habitat areas. Hot, dry summers also increase thermal stress and increase nutritional demands.

The drought of 1976 and 1977 were years of greater than normal spring and early summer stress, limiting green feed production and vegetative growth. Since the deer population was already at a low level, the effects were not of major proportion. Further, the winters were relatively mild which limited stress and allowed good deer carry over.

The general trend of deer decline from the early 1960's until the mid-1970's was also noted as a general trend for the western United States and was partially attributed to long-range weather. The reduction in deer numbers occurred similarly on hunted and nonhunted areas.

Thermal stress periods coupled with low nutritional forage stress tend to greatly reduce deer health and increase parasite, disease and predation. This points out that factors can be additive in regulating deer populations, and that uncontrollable factors, such as weather can set finite limits on management capability.

## 2. Habitat Quality

The age, distribution and composition of vegetative communities determine the available food value, the degree of usable edge and the amount of surface water for deer use. In general, early successional seral stages with new and young plants, tend to have high protein content with greater digestability. This is particularly true of chaparral habitats following fire. The early seral stages have greater plant diversity which gradually decreases as the community becomes older and dominant species shade out the less dominant. Habitat quality for deer is directly related to complexity of the vegetation mosaic.

Where there are numerous areas of varying age and species composition, the edge between areas is great with a better proportion of forage and escape cover. This also functions to increase access. Dense, homogeneous stands of chaparral and coniferous forest have little understory, low edge ratios, low species diversity and meet fewer deer needs than areas which have been opened up by controlled burning or selective logging, managed on a rotational basis. A diversity of age class and species composition can also be critical to fawning cover and forage diversity.

## B. Habitat Modification

Unlike weather factors, deer habitats can be managed. Likewise, land uses are impacts upon the natural habitats and the way land uses are managed can have a decided effect upon deer and other wildlife species.

### 1. Fire

Most of Lake County deer habitats have evolved with fire as a part of the environment. Chaparral species have large, well developed root systems, knobcone pine has dense cones, many plant seeds have tough coats which require scarification to germinate. Fire is a part of their natural environment. The conifer type also periodically

under-burned, probably on a less than 20 year cycle. This resulted in open stands of large timber, with young shrub layers and an abundance of forbs and grasses. As demonstrated by historic controlled burn programs, fire is a valuable tool for producing young seral stages of vegetation with high protein levels, in both chaparral and timber types.

Fire suppression and a general decline in controlled burning programs since the late 1950's, resulted in large tracts of dense chaparral, and unnatural accumulations of dead fuel in timberlands that carried wild-fire rapidly when ignited. This resulted in a number of large burns covering 15,000 to 30,000 acres. Large burns tend to negatively impact wildlife populations in an area for a short time, especially when all habitat is removed by the fire. By the time deer and other mammal species recover, the vegetation is beginning to mature again and the area does not develop the potentially high carrying capacity.

Since some 50 percent of Lake County deer habitat is chaparral, fire management is a major factor in deer herd maintenance. Areas which are currently high priority for controlled burning are on BLM, USFS and private lands in the Cow Mountain, Walker Ridge, Cache Creek, Sheldon Creek, Goat Mountain, Snow Mountain and Copper Butte areas. There are numerous key areas within these general areas which will be evaluated and prioritized as part of more specific prescribed burn plans. Most wildlife species are favored by prescribed fire, either through an increase in forage or the additional available water supply (Longhurst 1978).

## 2. Livestock Grazing

There are a number of factors associated with livestock grazing which can effect local deer populations. In general, sheep compete with deer more for browse, and cattle more for green feed. Both livestock types become serious competitors with deer when there are more animals than the vegetation can support. Most overgrazed ranges exhibit vegetation with a browse line to a maximum height that livestock can reach.

Constant grazing pressure prevents successive development of shrub species and young trees, particularly oaks. At some point in time such plant communities, unable to regenerate under these pressures, will disappear. These open, evenaged stands are deficient in cover and forage diversity.

There are few grazing ranges which have been managed by internal fencing to isolate livestock from critical deer use areas, such as meadows and waterway corridors. Also, there are numerous examples of waterway erosion and bank sluffing as a result of unrestricted grazing.

## 3. Timber Harvest

Dense stands of coniferous forest are of little value to deer other than escape cover, and represent climax communities with little

edge and diversity. Timber harvest tends to open up homogenous stands and create edge and plant variety. Where key wildlife areas exist, (meadows, glades, mixed hardwoods and waterways), harvest of adjacent dense forest can increase the value of these areas for deer. Key areas should not be disturbed from timber harvest unless conifer encroachment is their values, such as typically happens with meadows. Removal of all oaks and shrubs to develop pure conifer stands is highly detrimental to deer.

#### 4. Woodcutting

There are presently no comprehensive guidelines regulating the cutting of hardwoods. With the increase in fuel demands and the increased use of hardwoods for chip board, it is recognized that major vegetative changes could occur and might result in major impacts both to the maintenance of hardwood communities and their dependent wildlife species, particularly deer.

#### 5. Agriculture

The effects of agriculture on deer occur in two basic ways. First, there is habitat conversion from the native plants to the desired agricultural crop which permanently reduces deer habitat. Secondly, where agricultural interests do not fence their crops, depredation will occur, which usually results in depredation harvest of the deer. The effects of depredation harvest extend beyond the area of agricultural interest, and can hold local populations to low levels.

#### 6. Development

Development of urban and industrial uses in deer areas results in a loss in carrying capacity and will reduce herd size in proportion to habitat lost. Where such development occurs on key deer use areas, the effects can be serious for the entire local herd unit. Urban development generally means an increase in human disturbance. Such development also generally means an increase in dog populations which are rarely controlled. When allowed to run free, dogs often become serious predators (Jones and Stokes Associated 1977). Dogs tend to be successful predators, particularly in groups, since each is capable of inflicting damage.

#### C. Predation

It is generally accepted that predators, particularly coyotes, take some deer, mostly fawns, in Lake County (Taber and Dasmann 1958). However, the possibility that predation is limiting deer productivity is undocumented. It is highly probable that late fawning, coupled with early range dry-out and a loss of green feed during the spotted fawn stage, is responsible for a high percentage of fawn loss. Under such conditions, the

weakened fawns become easier prey and when they first die and/or are abandoned by the does, become food for local coyotes. Although specific causes are undocumented, high early fawn mortality is a fact. The addition of hunting stress during high solar stress periods and green feed shortages could also be a contributing factor to predator success.

#### D. Diseases and Parasites

There is no conclusive evidence that parasites and diseases contributed to a decline in the Clear Lake deer herd (Longhurst et al, 1976). A number of parasites and diseases have been recorded in the herd, but few are known to cause serious losses. Hoofrot periodically kills deer in numbers, and stomach and intestinal worms contribute to sporadic mortality (Longhurst and Douglas 1953). However, these factors operate on a density dependent basis and significant mortality is usually related to situations where deer temporarily exceed their habitat capacity. The severity of parasites and diseases is inversely related to nutritional status of deer with well fed individuals exhibiting greater resistance.

#### E. Hunting Harvest

The deer hunting season in Lake and Mendocino counties was traditionally held in August and September. Despite hot, dry weather most hunters generally prefer to take deer prior to the breeding season (Taber and Dasmann 1958) which normally begins in early October in the lower elevation resident deer and up to a month later in migratory deer which summer at higher elevations of the Pillsbury subunit. However, beginning in 1980, most of this subunit was placed in a hunting zone with a later season running from late September through mid to late October. The annual bag limit has been two bucks, forked horn or better, with the exception of 1979 when the limit in Lake County was reduced to one buck.

With only minor exceptions, antlerless deer have not been legal game in the herd unit since 1901 when bucks-only hunting was introduced as a statewide protective policy. The fact that bucks must have at least one forked antler to be legal, generally limits hunting harvest to mature males since most yearling bucks and a large portion of two-year-old bucks have spike antlers (Taber and Dasmann 1958, Anderson et al 1974).

There are no systematic records of the number of hunters in this deer herd unit. The Department's annual hunter questionnaire survey produces estimates of the number of hunters in each county. The four-year average for the period 1975-1978 was 7,931 for Lake County. It is reasonable to assume that this level of effort may be altered by the later season in the Lake Pillsbury subunit, however, the actual effect is not yet known. It has been estimated that up to 70% of the hunting effort occurs on the first weekend of the season (Taber and Dasmann 1958).



Another traditional aspect of deer hunting in Lake and Mendocino counties is the use of dogs, particularly in chaparral areas. Connolly (1966) conducted a survey of Mendocino County hunters and estimated that 11% always used dogs, 29% sometimes used dogs, and 60% rarely or never used dogs. Hunters who always used dogs claimed a success rate approximately 70% higher than hunters who never used dogs.

Taber and Dasmann (1958) estimated that under a bucks-only (forked horn or better) harvest strategy, approximately 5 to 7% of the population is taken annually. They concluded a harvest of 25 to 35% of the population could be sustained, but more liberal regulations would be required including the harvest of a substantial number of antlerless deer. For every legal buck killed or crippled, they estimated that over four deer died of other mortality factors. Connolly and Longhurst (1975) estimated that only two deer died of natural causes for every one taken by hunters from a heavily harvested population, while the ratio of natural to hunting mortality was estimated at 16:1 throughout Mendocino County. Intensive investigations indicate that the effects of hunting may be compensatory in terms of replacing, rather than adding to, other sources of mortality.

Increasing the hunting harvest tends to produce a population with the following characteristics: 1) few deer live long enough to die of old age; 2) fawn production and survival is high; and 3) individual deer are in better condition than in lightly harvested populations. In addition, habitat conditions are improved since a reduction in relative deer densities reduces foraging pressure on the preferred plant species.

Biologists familiar with the deer management situation in Mendocino County estimated that the actual buck kill was 50% greater than the reported kill as reflected by tag returns (Anderson et al 1974). This unreported kill includes crippling loss as well as illegal buck take. The same biologists estimated that no more than 25% of the legal bucks were killed each year. It is reasonable to assume that these estimates are valid in most of Lake County since the habitat types, land ownership patterns, and hunting pressure are similar over much of both counties.

#### F. Depredation Removal

Removal of deer in agricultural areas under depredation permits is an item of concern to some publics. Although complete records of the actual take are not available, peak numbers were taken in the early 1960's. Vineyards and orchards are the primary agricultural developments sustaining deer damage in Lake County. A substantial reduction in deer density is necessary to effectively reduce crop depredation. Low deer densities may conflict with other management objectives and public demands. Although depredation removals have temporarily reduced deer numbers locally, such removals are not thought to be a limiting factor for the herd as a whole.

#### G. Illegal Take

Based on the best estimates of local law enforcement personnel, a substantial but unknown number of deer are taken illegally each year including animals of both sexes and all age classes. As discussed previously, illegal and crippling loss of bucks during the hunting season are

thought to combine with the legal take of bucks to account for approximately 50% of those available prior to the hunting season. No specific estimates are available for the magnitude of the illegal take of antlerless deer. A high frequency of illegal deer take has been reported in agricultural areas when seasonal farm labor forces are present. Factors thought to contribute to high levels of poaching are remoteness of portions of the herd range, insufficient enforcement personnel, and seasonal concentrations of deer.

#### H. Highway Collision

Road kill of deer tends to be nonselective and correlates closely with herd composition counts in the proportion of bucks, does and fawns. Where roadways cut through high use areas, the effect can be significant, particularly when herd levels are low. Studies (Caltrans) indicate that an increase in highway speed resulting from road upgrade tends to influence mortality levels (Mansfield and Miller 1974). Further, road construction tends to follow drainages along riparian corridors where deer use is high. Both factors describe the present condition of Highway 20, bisecting the herd unit. This factor is not thought to be presently significant at the existing low level, but is bound to rise as the population increases.

#### I. Hunting Season and Boundary

The seasons and boundaries for hunting are important factors in the management of Lake County deer. As discussed previously, there are major differences between the migratory herd and the resident herd. The traditional hunting season has been from early August until mid-September. Opening weekend has historically been hot and dry. In the resident herd range, most bucks were out of the velvet with few spotted fawns still in evidence. Most of the fawns were weaned and dependent on a forage diet. In the migratory herd unit, the bucks for the most part, were still in velvet. In 1979, 100 percent of the bucks checked through the Soda Creek Station were in velvet. Spotted fawns were still observed in significant numbers. Most of the green feed for fawn growth and doe recovery was dry or drying, necessitating greater daily movement to feed. Most fawns had not been weaned.

In the resident herd area most lands are private and generally hunted lightly. There is little access to private lands for many hunters who mostly use the public lands of the Bureau of Land Management in the Cow Mountain and Indian Valley areas, and traditionally the Mendocino National Forest lands in the migratory unit.

The former early season boundary along the Lake and Mendocino County line was difficult to distinguish in many areas and placed the migratory herd in the early season. This placed hunters on the upper ridges which are important summer feeding areas, pushing deer into less preferred areas. The hunting activity added another stress factor by increasing deer movement and further limiting food availability. As an additional stress factor, the early season hunt on this herd was followed after a week break, by the late season extending to late October.

The season and boundary change of 1980, unified the migratory herd unit into one hunting season, with the western portion in the B1 zone and the eastern portion in the B3 zone. The boundary change between these zones was relocated to follow easily discernable topographic features to reduce hunter confusion and increase enforcement certainty.

The time change allowed antlers to mature, fawns were less dependent, does could recover from post-partum stress, forced movement during thermal stress would be reduced, and summer range would be available for feeding. The action still left southern portions of the Mendocino National Forest, where deer are more resident in nature, open to early season hunters. In regard to current seasons, there is some evidence that the resident herd in the A zone would benefit by a slightly later season of some two to three weeks. This would allow for a longer maturation period and a reduction in the stress factors, as noted above. The change, in this case, is not as significant to accomplish as was the late zone for the migratory unit. There is general hunter support for a slightly later A Zone season in the North Bay herd units.

#### J. Intraspecific Competition

Deer compete among themselves for available food supplies, fawning areas and other needs. This has a tendency to force some of the deer into more marginal habitats where they are subject to greater pressure of nutritional stress, thermal stress, predation and other factors. Competition for fawning habitat results in a given number of adult females with lower reproductive success due to the use of marginal areas. When food abundance is low in relation to herd size, fawn survival is reduced. When deer numbers are high, fawn loss is high. Recruitment is density dependent when deer approach capacity of the habitat.

#### K. Refuge 2A

State Game Refuge 2A is located in the northeastern portion of Lake County. It is within the high elevation area which forms the summer range for the migratory herd. Its most important effect on the deer population is to provide an area with a high percentage of mature bucks, relatively available to the nonconsumptive wildlife user. A secondary effect is to generate an enforcement problem for an already thinly-stretched law enforcement group. As discussed previously, it appears that deer numbers in the refuge also declined during the late 1960's despite the prohibition of hunting.

IV. MANAGEMENT UNIT GOALS

Goals for the management of the Clear Lake deer subherds were developed through a process involving review of historic and existing herd and habitat conditions, public concerns, goals and objectives of multiple-use resource programs and sociopolitical constraints. Following the evaluation of possible alternatives (see Alternatives Section), a set of deer herd goals was selected based on a ten year planning horizon. Goal selection involved evaluating potential costs, benefits, and trade offs with other resource programs and land uses. General direction was also provided by the appropriate laws, regulations and policies related to resource management on public lands.

The primary consideration in formulating goals for Lake County deer was to restore and maintain the population size and productivity at desirable levels through coordination with multiple resource management programs (A Plan for California Deer, 1976). Habitat must be improved to achieve these increases. Since environmental factors change seasonally and annually causing fluctuations in habitat capacity, goals are stated in terms of ranges for herd parameters. This Plan is intended to achieve the following conditions with a target date of 1990:

Pillsbury Subherd

	<u>1989 Target</u>	<u>1976-1980 Average Levels</u>
Post-hunting season buck ratio: 100 does	25 - 30	25
Spring fawn ratio: 100 does	50 - 55	41
Minimum reported buck harvest	750 - 800	180 - 300
Average deer density per square mile	35 - 40	15 - 30*

Clear Lake Subherd

Post-hunting season buck ratio: 100 does	30 - 35	25
Spring fawn ratio: 100 does	55 - 60	41
Minimum reported buck harvest	550 - 700	200 - 250
Average deer density per square mile	30 - 35	20 - 25*

\*Estimates, no specific data available

V. PROBLEMS IN MANAGEMENT

1. Population size and deer densities are below desired levels.
2. Fawn survival and recruitment are insufficient to meet herd goals.
3. Fire suppression policies have resulted in long-term deterioration of deer habitat due to natural vegetative succession to seral stages with low productivity. A lack of nutritious forage has reduced the capacity of much of the range for deer.
4. Conflicting land uses have reduced the capacity of important deer habitat areas. Examples are; intensive timber management; unmanaged livestock grazing in riparian areas, unrestricted recreational use in critical habitat, and insensitive residential and agricultural development in formerly productive forage and cover areas.
5. Removal of oaks for firewood has lowered the quality of some oak woodland areas for deer. Removal for range conversion does not always consider soil and slope.
6. Funds are limited for single purpose deer habitat improvement projects on public lands. Incentives to manage deer habitat on private lands have been lacking, and are presently limited.
7. Low hunter success has resulted in serious public concern over the deer resource and a decline in hunting use.
8. Multiple-use resource management has not been widely used to achieve benefits for deer through coordination with logging, livestock grazing, fuel control and watershed improvement programs.
9. Additional biological information is needed to determine seasonal range use, reproductive and mortality rates, and limiting factors for the herd.
10. Illegal and unreported harvest account for an unknown, but significant, portion of the annual harvest.
11. Feral and domestic dog predation on deer is thought to cause significant mortality in the herd.
12. Access is limited in some areas, more than needed for hunting in other areas, leading to enforcement problems, poor hunter distribution and "land locked" hunting opportunities on public lands. It is presently keyed to roads but should be keyed to overall access; roads, trails (foot and horse), dense brush fields, etc., or appropriate to the specific situation and sensitive resource values.
13. Public attitudes related to antlerless harvest seriously constrain deer management alternatives.

## VI. MANAGEMENT PROGRAM, OBJECTIVES AND RECOMMENDED PRESCRIPTION

The following programs, specific objectives, and recommended prescriptions are designed to achieve herd plan goals. They were developed after considering various alternatives and are intended to provide basic guidance for land management programs to benefit deer.

### A. Inventory and Investigative

Objective: To collect and maintain sufficient information on a subherd basis to effectively manage deer and their habitat and monitor progress toward herd goals.

#### Recommended Prescriptions:

1. Conduct spring and fall herd composition counts annually, achieving sample size of at least 250 on each subherd. Coordinate surveys with local agencies and publics for greater data input.
2. Develop a herd simulation model relating herd performance to habitat capacity, allowing prediction based on various harvest strategies and improvement programs, and update it annually.
3. Operate hunter check stations (Cow Mountain, Soda Creek and Upper Lake) to monitor public attitudes, collect biological data on harvested deer, increase reporting of the harvest, etc.
4. Intensify the evaluation program of highway mortality for herd composition and condition supplementary herd composition data, and identification of problem areas.
5. Initiate an evaluation of vegetation and deer responses to manipulation of white, blue, and Brewer oak stands. Thinning, clearing and burning of small patches are primary treatments to be tested.
6. Evaluate and report deer responses to meadow fencing within the summer range.
7. Refine and validate information related to seasonal ranges of migratory deer (Pillsbury subherd). Delineate and map critical habitat elements on these seasonal ranges (summer, intermediate, winter, migratory corridors).
8. Evaluate the effectiveness and value of Refuge 2A.
9. Initiate a deer habitat inventory program designed to collect background data for the Hull-Bald Mountain-Etsel Ridge Watershed Project.
10. Initiate a deer habitat inventory program designed to collect background data for the upper Cache Creek-Indian Valley-Walker Ridge Project (BLM/USFS planning project).

11. Develop and implement a method to monitor deer density in various habitat types.

12. Develop and implement a program to evaluate Cow Mountain brush manipulation and deer and other wildlife responses to treatment.

13. Accurately determine the role of coyote predation of fawns in relation to habitat conditions. It is anticipated that a special research project will be required.

14. Increase interagency coordination on deer and habitat evaluation of programs.

#### B. Mortality Control

Objective: reduce all causes of mortality, other than legal hunting harvest, in an effort to increase deer numbers to achieve herd goals. Emphasis will be placed on eliminating mortality which limits deer below the capacity of their habitat. Nutritional stress, a major mortality factor which predisposes deer to other causes, is covered in the habitat element of this Plan.

#### Recommended Prescriptions:

1. Cooperate with Caltrans and County agencies to minimize highway deer kill, particularly on Highway 20, by signing, etc.

2. Seek a change in current regulations which would encourage private landowners to utilize public sport hunting to reduce deer depredation on agricultural developments, i.e., ability of landowners to approve special hunt participants, and to control harvest levels and composition.

3. Reduce parasite and disease problems in coordination with the Habitat Element of this Plan.

4. Where evidence implicates coyote predation as a factor limiting fawn survival, initiate a program to reduce coyote numbers in conjunction with increasing deer cover elements (see Habitat Element).

5. Coordinate recreational use on public lands to minimize human disturbance of deer in critical habitats, i.e., fawning areas. Schedule enduro races to avoid spring reproduction period, and early summer recovery and growth period of deer.

6. Coordinate with County Agencies for control of dogs that may harass deer.

7. Develop a program to encourage private landowner participation in Coordinated Resource Planning and SB 1704 to gain protection for important wildlife habitats.

C. Habitat

Objective: To create the conditions described by the following Habitat Models in three major habitat types by 1990.

Chaparral (Includes scattered oak stands)

Cover ----- 50% of Area

1. Hiding (escape) cover . . . 4 + year brush distributed in 20 to 40 acre patches . . . . . (25%)
2. Fawning cover . . . 10 acre cells associated with nearby (0.1 mile) water and riparian vegetation . . . (10%)
3. Thermal cover . . . overstory vegetation providing summer shade. . . . . ( 5%)
4. Optional . . . to be devoted to major limiting factor of above cover types. . . . . (10%)

Forage ----- 50% of Area

1. New brush . . . 1 to 3 year brush distributed in 10 to 20 acre patches . . . . . (15%)
2. Annual grass and forbs . . . . . (15%)
3. Perennial grass . . . . . (10%)
4. Oaks and/or riparian . . . . . (10%)

Water ----- available within 0.5 mile

Solitude \_\_ for the fawning period (essentially May 1 through June 15)



Mixed Conifer Forest

1. Meadow or glade . . . . . 10%
2. Browse (available and nutritious) . . . . . 15%
3. Immature timber (seedling, sapling) . . . . . 15%
4. Open (less than 50% crown cover) timber . . . . . 20%
5. Mature (50 to 100% crown closure) timber (including pole-sized stands) . . . . . 40%
6. Oaks (a minimum of 200 sq. ft. per 40 acres, even distribution of age classes)
7. Water . . available within 0.5 mile
8. Solitude for fawning period (June 1 to July 15) in reproduction centers from physical harassment.

Blue Oak-Grassland

1. Fawning cover . . . 10 acre cells associated with nearby water (1.0 mile) and dense vegetation for escape cover . . . 10%
2. Escape/thermal cover . . . heavy, thick oak and/or brush stands, distributed ideally within 300 yards of forage areas in at least 10 acre patches . . . . . 10%
3. Annual grass and forbs . . . open to sun, preferably on south slopes, ideally in proximity to escape cover . . . . . 20%
4. Blue oaks . . . ideally with a full range of age classes; at least 25% of mast producing age . . . . . 60%
  - a. Oak type should include preferred brush species as understory. . . . . 10%
  - b. Oak type should include riparian, small meadows. . . . . 10%
  - c. Oak type should include larger down trees, logs or rock outcrops, 2 to 3 per acre.
  - d. An understory of tall herbaceous vegetation ( > 2 feet, such as wild oats) should occur under 50% of the blue oak stands.

Recommended Prescriptions:

1. Prescribe burn or otherwise manipulate 2,500 acres of chaparral vegetation per year within the Mendocino National Forest.
2. Prescribe burn 10% of the perennial grass type (fuelbreaks, type conversions) per year within the Mendocino National Forest.
3. Prescribe burn or otherwise manipulate 500 to 1,000 net acres of chaparral vegetation per year on BLM lands.
4. Prescribe burn (10,000) acres annually of chaparral vegetation on private lands under authority of SB 1704.
5. Complete a coordinated Resource Plan for the Indian Valley-Upper Cach Creek-Bartlett Mountain-Walker Ridge area by 1983.
6. Complete plan and implement the Hull Mountain-Etsel Ridge-Bald Mountain Watershed Restoration Plan in 1981.
7. Complete a habitat improvement plan for the Bloody Rock-Skeleton Glade key wintering area by 1982.
8. Complete the Lake Pillsbury Tule Elk Management Plan by 1983.
9. Expand existing cooperative glade fencing in summer range to 3 projects annually.
10. Bring the Pitney-Bartlett CRP to full production level by 1981.
11. Protect all riparian vegetation from modification except for essential water development projects. Increase riparian vegetation to maximum effect possible in summer/intermediate range. Support County ordinance for riparian protection on private lands. Support landowner assistance programs for internal fencing of key habitat areas on livestock ranges and other areas. Support balanced aggregate removal from waterways and long-range plans.
12. Protect all meadows and glades. Allow no decrease in this type in summer range conifer belt.
13. Do not convert staple or preferred browse species to another vegetative type in summer/intermediate range conifer belt unless suitable browse has been developed in adjacent areas.
14. Rejuvenate (restore) all staple and preferred browse species within (public) timber sale areas to satisfactory deer forage condition.
15. Under burn portions of conifer stands with evenage, scattered understory of preferred brush species. Program about 25 percent of this type work per timber sale area per entry where compatible with timber and other land management objectives.

16. When centers of deer use are identified as affecting tree plantations, locate suitable adjacent browse and fertilize as an attractant. Monitor for three years, evaluate, and document.

17. Protect all black and live oaks within five chains of main and main lateral ridges (migration routes).

18. Maintain existing vegetative diversity within five chain radius of all meadows, glades, springs, and seeps.

19. Consider tree plantations less than 10 years old as equivalent acres in the meadow/glade acreage of the Conifer Forest Habitat Model.

20. Rejuvenate 100 acres decadent knobcone annually.

21. Develop age class diversity on a "less than 40 acre patch" basis in the blue oak type. Complete project over a gross area of 2,500 acres by 1985.

#### D. Utilization

Objective: Provide for a minimum annual reported buck harvest of 1300-1500 animals, and a post-hunting season ratio of 25-35 bucks per 100 does.

#### Recommended Prescriptions:

1. Monitor and evaluate the 1980 hunting zone boundary changes (A to B1) until 1984 to fully determine the effects of the recent modifications. Based on the findings, make additional recommendations to maintain or further modify regulations, if necessary, to achieve specific objectives.
2. Maintain hunting seasons in the Pillsbury and Clear Lake subherds which are keyed to the basic migratory versus resident status. Since Pillsbury deer are primarily migratory and breed later in the fall than the resident Clear Lake deer, the timing of the hunting seasons in each subunit should correspond to these basic factors. An August, early September season is proposed for the Clear Lake herd and a late September-October season is proposed for the Pillsbury herd.
3. Manage recreational access to provide an adequate trail system on Forest Service and BLM lands, which are presently open to the public.
4. Develop a program to increase appropriate hunting access to public land, some of which is presently "land-locked," and for reduction of access into those with more than needed for hunting.
5. Reduce the road/trail density and period of use in areas of summer range where conflicts occur with maintenance of fawning habitat quality.
6. Develop an annual program to construct browse ways and trails to increase hunter access to burned or otherwise enhanced areas where ORV use can be controlled. Use hunter access and increased deer availability as criteria for prescribed burning.
7. Restrict ORV use on public land through seasonal closures and enforcement during the deer hunting season. Schedule the fall enduro race to avoid the deer hunting season.
8. Use a summary of this Plan to provide information to hunters at BLM and Forest Service visitor facilities.
9. Develop a coordinated road and access management plan with Louisiana-Pacific.

#### E. Law Enforcement

Objective: To minimize the illegal take of deer in Lake County.

#### Recommended Prescriptions:

1. Coordinate the enforcement of deer regulations with other appropriate agencies (USFS, BLM, Sheriff) and formally establish operating procedures to increase enforcement capabilities.

2. Formally coordinate efforts to enforce deer regulations between Department of Fish and Game, Regions 2 and 3, particularly in the area around Snow Mountain.

3. Operate hunter check stations to increase the reporting of the harvest and Department visibility to the public.

4. Post and maintain signs around Refuge 2A, and along the hunt zone boundaries of the A, B1 and B3 zones.

5. Encourage public reporting of observed hunting violations. Publicize Cal TIP secret witness program.

6. Increase the capability of Wardens through additional hiring, seasonal reassignment, and 4-wheel drive vehicles.

F. Communication of Information

Objective: Provide information on deer herd conditions and management to all interested publics and develop a system for incorporating public input into management programs.

Recommended Prescriptions

1. Make copies of a summary of this Plan available to all interested publics.

2. Attend meetings of local clubs and civic organizations to keep them informed of herd management programs.

3. Make herd information available to appropriate County agencies for use in land management planning decisions.

4. Develop public information handouts on public lands and opportunities for both consumptive and nonconsumptive uses of deer in Lake County.

5. Continue hunter survey initiated in 1980.

6. Annual coordination meetings with CDF to transmit deer habitat priorities for inclusion in their SB 1704 program.

G. Review and Update

Objective: Annually review and update the Herd Plan as appropriate information becomes available.

### Recommended Prescriptions

1. Conduct an annual interagency meeting to discuss the Herd Plan and achievements involving the Department, USFS, BLM, CDF, and interested sportsmans clubs.
2. Formally update the data base for the Herd Plan and convey additions to all Plan holders.

## VII. MANAGEMENT ALTERNATIVES

Management of deer is essentially concerned with the output of a natural resource (species of wildlife) for use and enjoyment by outdoor recreationists, both hunters and nonconsumptive users. As such, management alternatives must first define various population levels that can be reached and maintained through time, requiring different levels of management intensity for each. Such population goals express alternative levels of resource output, each with a unique level of costs and trade-offs associated with its implementation. The following alternatives were considered, but not selected as management direction for the Clear Lake deer herd:

Management Alternative 1 - Maintain the current population level through minor habitat enhancement programs.

### Predicted Effects

1. A continued harvest of approximately 500 animals is expected, approximately 400% less than the estimated biological potential of the range.
2. A continued minor level of deer conflict with other land uses, such as agriculture, subdivision, intensive range and timber management since deer densities are relatively low.
3. A continued gradual decrease in hunter recreational use of the deer resource.
4. Failure to achieve the Statewide goals of the "Plan for California Deer," AB-1521, "Investing for Prosperity," and failure to respond to a significant public concern for the enhancement of the herd.
5. Deer numbers may increase as a result of present CDF projects associated with SB-1704, Bureau Land Management and U.S. Forest Service prescribed burning programs for multiple resource benefits. The increase, however, will be unmanaged and less than its potential under coordinated resource management programs.
6. Direct additional costs to the CDF&G would be relatively low. No significant trade offs would result related to other resources, since no other values are foregone or intensively coordinated with benefits for deer.

Management Alternative 2 - Restore the population to historic levels associated with the early to mid-1950's.

### Predicted Effects

1. Annual harvest of up to 2,000 bucks could result. Additionally, if the full biological capability of the range is utilized through extensive habitat improvement, light to moderate antlerless deer harvest could increase the harvest by an additional 100-200%.
2. High deer densities would conflict at least locally with other resource programs. Serious conflicts may be expected with agriculture, timber and oak regeneration, and maintenance of a balance between all seasonal habitats.

3. Hunting and nonconsumptive use could double, bringing pressure to recreational facilities and road systems, especially on public lands.

4. Direct cost to the CDF&G would be substantial including additional manpower and funding to support habitat improvement and coordination of other resources to minimize conflicts/competition. Unless more liberal deer regulations including the harvest of a substantial number of antlerless could be instituted, most of the additional expenditures would be wasted.

Management Alternative 3 - Any selected population level between the extremes defined by Alternatives 1 and 2.

Alternatives 1 and 2 set up technical, social, and economic boundaries of the management situation and thereby (in planning theory) develop a suitable range of other population alternatives to evaluate (specifically, populations that will support a harvest of more than 500, but less than 2,000 bucks). The following conclusions can be drawn from existing data which tend to identify specific population levels within this range as (500-2,000) viable management goals.

1. The effects of SB-1704 on private land and the relatively new multiple resource management programs on public land are likely to result in up to a 100% increase in the deer population by 1990 (harvest of 1,000 bucks) without significant management effort or expense, if climatic conditions are favorable.

2. The Grindstone Project in Glenn County has demonstrated that deer populations can be tripled over 7 to 10 years if habitat improvement is coordinated with projects of other resources (timber management, fuel control, and livestock grazing) for maximum benefits (harvest of 1,500 bucks), at relatively low levels of funding.

3. "A Plan for California Deer" recommends mid-1960's levels as an appropriate management goal (harvest of 1,500-1,600 bucks in Lake County) for deer herds Statewide.

4. Historic harvest levels (in excess of 2,000 bucks) cannot be recreated within the Clear Lake subherd due to permanent loss of deer habitat to agricultural and land development interests. Clear Lake was the most productive of the two subherds (historically 2 to 1) until 1977. Restoration of historic harvest levels of 2,000 bucks with the Pillsbury subherd substituting for the historic Clear Lake subherd role, would be accomplished only at great expense in direct habitat improvement and significant loss (or compromise) of other resource outputs.

#### Selected Management Population

Annual harvest of 1,300-1,500 bucks through coordination of other resource management programs at minimum expense, with harvest about equally divided between the subherds.

This is a summary of the preferred alternative as outlined in our programs.



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IX. APPENDICES

Appendix 1 - Vegetation classification of Lake County.

Appendix 2 - Land capability classifications for Lake County.

within deeper soils. Live oak in both tree and shrub forms skirt the foothills and generally intergrade to northern oak woodland and chaparral. Also, mixes of Oregon and black oak are found in small ravines on cooler and moister slopes, with more open grassland prevailing on exposed slopes. Oak savanna merges with riparian in valley areas. The valley oak is the most common savanna species, and is generally threatened with slow demise because of its association with productive agricultural soils and flat developable lands. Old trees compose the largest portion of this type with little opportunity for natural regeneration in most areas. Livestock grazing and firewood utilization can have significant affects upon deer populations when there is competition for acorn supplies and loss without replacement. Management needs include limitations on selective tree removal, isolation of key areas from livestock use and controlled grazing pressure.

11. Grassland types occur throughout Lake County depending on climate, soils and species. In general, most plant communities contain grass understory, and when modified by fire or other removal, grasses are the first plants to invade. Since the introduction of livestock and non-native species, the historic grassland types of native perennials has given way to annuals.

Native perennial grasses, such as needle grass and wild rye, are characterized by massive and deep fibrous root systems where energy is stored for leaf and shoot production, rather than in heavy seed production which is typical of annuals. Prolonged grazing of top growth gradually depletes the capacity of the perennial plants to photo-synthesize and store food for the next year's growth. As a result, annual grasses with less nutritional value and volume compete successfully, but provide a very short growth period which ends when soil moisture is depleted in early summer.

Very little "natural grassland" now exist, and most are mixes of wild oat, soft chess, rye, filaree and clovers. Where overgrazing has occurred and range depletion is coupled with trampling and erosive soils, thistle and other weed species are evident.

Deer use of grasses is heaviest in the spring when they are succulent and tapers off as grasses dry. Main forage species during the rest of the year are forbs. Most often, grasslands merge with brush, chaparral, scrub, vernal pools, and marshes. Concentrations of water will create semi-marshy meadows with more attributes of grassland than marsh, and are key areas for deer use, especially when intermixed with conifer forest or woodland which provides adjacent cover and forage diversity.

The greatest threat to grasslands have been incremental development with major loss of productive grassland soils. A long history of grazing has reduced many grassland slopes and their soils to a thin vegetative layer on eroded surface soils, except where supplementary seeding and/or fertilizing programs have been carried out. Concentrations of animals in limited areas destroys grass and forb cover and the exposure of fragile soils adds to the cumulative erosion.

Good range management means control of stocking density, rotation of stock, fertilization and seeding programs and reasonable locations of herding and staging areas. For deer and other wildlife species, areas of erosive soils should be left to nongrazing units scattered through the range with emphasis on meadow conservation and protection of adjacent habitats for increased diversity and edge.

# THE LAND CAPABILITY CLASSIFICATION

The capability classification is a practical grouping of soils. Soils and climate are considered together as they influence use, management, and production on the farm or ranch.

The classification contains two general divisions. (1) Land suited for cultivation and other uses, and (2) land limited in use and generally not suited for cultivation. Each of these broad divisions has four classes which are shown on the map by a standard color and number. The hazards and limitations in use increase as the class number increases. Class I has few hazards or limitations, or none, whereas Class VIII has a great many.

## LAND SUITED FOR CULTIVATION AND OTHER USES

**CLASS I** Soils in Class I have few or no limitations or hazards. They may be used safely for cultivated crops, pasture, range, woodland, or wildlife.

**CLASS II** Soils in Class II have few limitations or hazards. Simple conservation practices are needed when cultivated. They are suited to cultivated crops, pasture, range, woodland, or wildlife.

**CLASS III** Soils in Class III have more limitations and hazards than those in Class II. They require more difficult or complex conservation practices when cultivated. They are suited to cultivated crops, pasture, range, woodland, or wildlife.

**CLASS IV** Soils in Class IV have greater limitations and hazards than Class III. Still more difficult or complex measures are needed when cultivated. They are suited to cultivated crops, pasture, range, woodland, or wildlife.

## LAND LIMITED IN USE--GENERALLY NOT SUITED FOR CULTIVATION

**CLASS V** Soils in Class V have little or no erosion hazard but have other limitations that prevent normal tillage for cultivated crops. They are suited to pasture, range, woodland, or wildlife.

**CLASS VI** Soils in Class VI have severe limitations or hazards that make them generally unsuited for cultivation. They are suited largely to pasture, range, woodland, or wildlife.

**CLASS VII** Soils in Class VII have very severe limitations or hazards that make them generally unsuited for cultivation. They are suited to grazing, woodland, or wildlife.

**CLASS VIII** Soils and land forms in Class VIII have limitations and hazards that prevent their use for cultivated crops, pasture, range, or woodland. They may be used for recreation, wildlife, or water supply.

Capability classes are divided into subclasses. These show the principal kinds of conservation problems involved. The subclasses are: "e" for erosion, "w" for wetness, "s" for soil, and "c" for climate.

Capability classes and subclasses, in turn, may be divided into capability units. A capability unit contains soils that are nearly alike in plant growth and in management needs.

The units are: "1" erosion hazard; "2" wetness problems; "3" slowly permeable subsoil; "4" coarse texture, low water-holding capacity; "5" fine textures, tillage problems; "6" salinity or alkali; "7" cobbly, rocky, or stony; "8" root zone limitation, bedrock, or hardpan; "9" low fertility, acidity, or toxic properties; and "0" very coarse textured substratum.

CLASS I (III);

EXAMPLE

## 1989 Deer Herd Management Plan Update

Deer Herd: Clearlake  
County: Lake  
Zones: A and B1

Unit Manager: Allan Buckmann

### A. Description of the Deer Herd Management Unit

#### 1. Herd Condition:

Variable. There is a wide range of deer density within the Unit subherds. Composition counts indicate the trend is for fair to good deer densities in the northern and western sides of the County, and low to very poor deer populations across the eastern and southern areas.

In some areas the transition from few to many is drastic. In the Adobe Creek area near the southern county line, for example, the deer populations go from very low in the Lake County basins, to high deer populations in the Sonoma County basins and Geysers area to the south.

There are also "islands" of density. Soda Bay, on the shores of Clear Lake, has moderate deer densities, but is surrounded by low density areas, with Buckingham Point to the east, Kelseyville to the south, and Lakeport to the west. The Cow Mountain area also has similar density and island character. There are land use, water, and habitat differences separating these areas.

The high variability of density within the County has created numerous sub-herd units, which are not yet broken out for more specific survey and evaluation. Composition counts presently indicate average ratios rather than specific unit conditions.

Present personnel levels are too low to allow for more in-depth survey and analysis.

- a. Animal Condition: Most animals checked have been in good condition, with notable body fat. Fat indicies are not taken on a regular basis.

Bucks checked at check stations in Upper lake and Cow Mountain during the A-Zone opener, and at Upper Lake and Lake Pillsbury during the B1-Zone opener have indicated fair to good fat reserves. Some 75+ samples are taken at this time.(recent years)

November 1989

OUTLINE OF INFORMATION NEEDED FOR THE  
ENVIRONMENTAL DOCUMENTATION OF DEER HUNTING

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Field necropsy. Fresh animal carcass from highway collisions, and die-off are routinely checked when found along highways or reported by citizens.

Most of the animals checked in recent years have indicated that fat reserves are generally good, and that most deer death, as assessed from recoverable carcasses, has been a result of viral disease.

Assessment of the viral disease die-off in Clearlake indicated that a high proportion of the vehicle highway deaths were related to a stage of confusion and disorientation produced by a secondary infection of bacteria in the brain, in a later cycle of the viral infection.

Viral disease victims all had fair to good fat storage. The disease acts so rapidly that body reserves are little effected (some 10-12 days.) They are basically healthy animals hit by a virulent organism.

Systematic data collection at more detailed levels has not been a unit program because of limited time and funds for survey assistance. Present programs are limited to opening weekend check stations, and the collection of an occasional carcass for field checks.

note:

The Department presently need Biological Survey units for assisting Unit Managers, so we can move into the next phase of active deer and wildlife investigation, planning, and management.

Studies are presently in progress for evaluating data collected on the herd, and evaluating general field conditions to provide future study guidance. Some deer carcass necropsy and sampling will be done with road kill deer for, viral, parasite, condition, age, sex, location, date, and etc. information, to profile herd conditions.

b. Herd Health: Composition counts indicate there are good Buck/Doe/Fawn ratios in both low and high density areas. The loss of comprable ratios of these animals suggests that major mortality factors ~~appear to be~~ overall non-selective for sex or age. This would indicate mortality factors are from disease, poaching, predation, and vehicle collision.

2. Population Size: The diversity in deer densities, and lack of more detailed survey, make accurate estimations of total deer numbers difficult.



The question of total numbers is a question which in itself does not recognize the dynamic nature of populations, where birth and death continually fluctuate, with weather shifts and changes in water levels and food production, land use and cover changes, and other environmental factors.

It is usually the first question asked by persons who are unfamiliar with population dynamics. Not only do total numbers change seasonally, they are different for all habitats, which are spread out in complex mosaics, and then influenced by differing land use practices. It would take a considerably greater number of data collectors to be able to answer this question for the sub-units more accurately, and still not be totally correct.

The knowlege of overall population numbers, however, means very little to a hunting strategy which utilizes only bucks, since herd numbers cannot be controlled or significantly impacted by buck take alone. The harvest of bucks relates more to the balance (ratio) within the herd, than to herd size. For local deer populations to be seriously reduced, it requires a loss of 18% or greater of the female portion of the herd.\* *Computer Simulation Study*

There are no legal antlerless hunts in Lake County. The local publics do not support antlerless hunting. The loss of antlerless deer in all units is not related to legal hunting.

Present conditions in several of the responsive sub-units could technically support some antlerless strategy. Because of the present need to allow maximum immigration from these units into adjacent areas which have very low population levels, antlerless strategies are not presently recommended.

Low population units which ~~and~~ are not responding to habitat modifications and good feed conditions, now need more detailed surveys and possibly more restrictive controls to reduce illegal harvest and other mortality factors. Since we are not the landowner in most cases, the regulations are limited to closures or bag limits, and do not control land use.

Recommended actions include; population density surveys (where we can obtain access), area closures to reduce illegal take until areas can be better profiled (public lands), testing of livestock for disease presence (all lands, as allowed), predator density survey and analysis, parasite sampling for disease, and the identification and mapping of vernal and deadwater (seasonally stagnating) ponds/lakes for insect production and disease presence. Greater field data collection and personnel levels will be required for more detailed herd profiles.

A major die-off of deer during the summer and fall of 1987, centered around the City of Clearlake (Borax Lake), with an estimated death of some 300+ deer. Of these, some 47 were necropsied, and viral disease was determined as the primary cause. There were only eight (8) deer observed in the area during followup surveys. Borax lake is a famous midge, gnat, and fly production area and is vernal.

Deer loss from viral disease occurs regularly and annually at differing levels and locations, throughout the unit. The areas with low populations all have vernal basins, and most have heavy livestock grazing. (see B3)

The 30 year trend has been for most areas a longterm decline. The late 1950's represented the peak of deer production and densities in the County, which was an increase in deer numbers from earlier times that was brought about by controlled burning programs.

The legal reported buck kill reached a peak in 1956 at 2030, then dropped to a low of 285 in 1979 (also year of Zone change), and has held near 500 per year since then. The level at the present time represents about one quarter (25%) of the peak numbers during the 1950's, and less than 50% of the 1200 per year average during the 1920's.

### 3. Herd Statistics - 10 year table

Year (fall/spr)	Buck Harvest total	Herd Composition Counts					
		Fall		Spring		Spring	
		B/100D/F	F/100D	F/100D	B/100D/F	F/100D	F/100D
1978-79	514	34	51	61			
	<u>A2-zone</u>						
1979-80	285	47	56	58			
	<u>A &amp; B-zone</u>		<u>A-zone</u>		<u>B-zone</u>		
1980-81	410	27	72	70	28	79	63
1981-82	488	21	54	49	23	55	40
1982-83	530	27	38	49	21	41	41
1983-84	432	25	70	60	28	69	54
1984-85	498	32	63	60	25	68	57
1985-86	592	31	68	56	23	68	48
1986-87	510	29	62	56	*	*	*
1987-88	506	29	37	*	*	*	*
1988-89		*	*	*	28	58	*

\* Composition counts not completed or sample size too small

#### 4. Deer Hunting

##### a. Past and current hunting strategies' effect on:

1. Deer Numbers: In order to understand the effects of hunting on deer numbers, it is necessary to review the major historical activities which have been documented to have had a direct influence on herd numbers.

Early market hunting had no controls and resulted in the near decimation of many herd units. It began with the early settlers, and wild game was the staple food for the rapidly growing west. By the late 1800's, deer became so few, that it became noteworthy just to see one. There are stories of farmers stopping work to track such a deer for days to get meat. Sportsmen were at the front for changes in the law.

The "Buck Law" was the result, and it set the first sport hunting seasons, and limited the kill to buck deer only, as the way to effect herd recovery. The program was so successful in reducing the loss of females, that it soon resulted in population eruptions and overpopulations. This is the typical normal herd response to light loss.

Overpopulation led to rapid food depletion and starvation, with deer dying of secondary complications such as pneumonia, and parasites. There were large die-offs. The herds had attained levels which would respond to seasonal habitat and food production changes. It was clear that the effects of overhunting could be controlled by seasons and bag limits, and that too light of a harvest would result in overpopulation and starvation. This is the same scenario as no hunting.

The die-offs were responded to in the late 1940's by the beginning of major habitat management in the form of controlled burns. The thought was to provide more feed and hunter access. There was a notable increase in the numbers of deer, estimated at '30 to 50% above previous herd levels, and resulted in the highest deer numbers on record. There was also larger die-off from the seasonal food shifts.

This illustrated that habitat condition has a direct impact on deer herd production and survival. It also indicated that buck only harvest does not control herd numbers adequately to prevent natural die-off from overpopulation.

Following this period was a regression away from burning because of liabilities, and a general decline in deer abundance. This resulted in some 20 years of plant succession, decadent chaparral, and climax communities which both limited deer production, and increased catastrophic wildfire hazards.

Going full cycle, the reintroduction of controlled burning in the late 1970's has aided in the regeneration of high protein forage, better age class mosaics in the plant communities, and greater deer capacity.

Deer response in several sub-units, such as the Geysers, have been normal and similar to historical response. Other areas have continued to decrease in deer production, and deer are scarce. Viral diseases are thought to be responsible for the major lack of recovery in these areas, and there is evidence to support the idea.

From the above discussion of historical trends, it becomes obvious that the major factors affecting herd response are caused by land use practices, weather, and disease, and not sport hunting.

There is also an intermix of hunted and non-hunted areas with similar habitats and deer densities. Hunting cannot account for these conditions. Only harvest or loss levels which exceed doe recruitment and production can have a serious impact on herd numbers. This has all been well documented. Hunting programs have consistently been at conservative levels and are not responsible for poor herd conditions.

2. Herd Composition: There are few records to indicate herd composition at the arrival of white man. No doubt it was variable and probably was similar to the herd growth stage during the 1940's and 50's, since the indians used burning regularly, as well as hunting to manage herds.

With a bucks only strategy, with normal herd response, there is a low and gradual replacement of bucks with does. Since replacement fawn ratios are 50/50 buck/doe, with females surviving at slightly higher rates early, with the trend reversed after 2 months, when they convert to "hard" feed and male food dominance begins. The females can't compete in the chaparral with the bucks which drive them off, and more does are lost to starvation, which can rebalance the ratio somewhat.

With abnormal herd response and very low herd numbers, and the possible presence of sterility in both buck and doe portions of the herd, (see B3), the effects of loss may be significant. The no hunting strategy in this case would be more to control access and prevent the illegal take, than in concern for numbers from buck loss.

The no hunting strategy in a normally responsive herd would result in overpopulation, starvation, and die-off. In a captive situation (Angel Island) there was a greater loss of females than males, and herd ratios had high buck levels.

In a herd unit where deer numbers are suppressed below the available food supply, and other factors are affecting the herd, the no buck hunting strategy would limit loss only slightly, and may or may not be of concern, depending on herd levels.

Large die-off, however, radically changes the population toward younger animals which exhibit higher buck to doe ratios. What follows is basically an erupting herd, but total numbers were reduced providing lower actual recruitment. This is the dominant condition in the low population areas. In comparison, the hunting season has little to no impact.

3. Herd Health : There are presently a high number of herd sub-units, generally divided by basins, with highly variable deer densities and health conditions.

Hunting in a normally responsive herd helps to reduce the number of animals which will enter the "limiting season" of low food abundance. This reduces food competition, increases food abundance for survivors, and promotes herd health. Healthier does produce healthier fawns, and the incidence of twins and triplets increases.

Antlerless hunting at low levels would be beneficial to herd health by the reduction of numbers prior to the limiting season in these units, and decrease the incidences of starvation.

Better health also reduces overall stress impacts and susceptibility to parasites and many diseases, but not the present viral diseases.

The "buck only" strategy will only slightly reduce herd numbers, since buck harvest rarely removes more than three percent of the total herd, generally less. Since buck harvest does not control herd numbers, it can be

safely utilized in almost any deer unit, using the buck to doe ratio to monitor buck proportions, and decide between one or two buck harvest level.

Annually, in a normally responsive herd unit, there is about a 30% herd increase at spring recruitment, then a corresponding decrease, generally a die-off, to meet seasonally changing food levels. This is regardless of hunting. Normal cycles without hunting are "feast then famine."

The limiting seasons of the Clearlake Herd, are during the hot summer dry-out when fawns and does loose needed greenfeed and surface water, during the fall when poor acorn mast production occurs, or when an abundance of mast is available without other greenfeed, and during the blood feeding insect production cycles from March thru November, when virus is present.

In the low density areas, new strategies are needed for both harvest and land use. These need to be profiled by detailed survey to further clarify problems and solutions.

b. Future and proposed hunting strategies' effects on:

1. Deer numbers: The proposed hunting strategy is a continuation of the present "bucks only" system, which will have little effect on herd numbers, and the implementation of field data collection programs to profile herd dynamics.

2. Herd composition: The gradual shift of buck to doe ratios toward fewer males, as a result of the buck only strategy, appears to be rebalanced in some areas by other mortality factors, making it less noticable. It is not a major factor in herd dynamics.

3. Herd health: The reduction of herd numbers prior to the "limiting season" is beneficial to herd health, even in small ways. Present problems with herd recovery are not related to the hunting strategy.

5. Illegal harvest: In some areas illegal harvest is a major problem with significant impact on deer herd numbers. There are reports and known information regarding local poaching for market sales, protection of "pot" gardens, vineyards, and other agricultural related activities.

These losses can influence herd numbers and confuse survey and management information. There are many private lands with difficult direct access. While they can have serious local results, they are considered to be less significant than disease in overall impact.

Where these mortality factors are occurring together, the accumulative effects would be significant.

These losses tend to be non-selective, where all animals seen are taken. This loss would result in similar regrowth conditions as large die-offs, with high juvenile levels and more balanced sex ratios.

## B. Non-Human Effects on Deer

1. Weather: Weather plays a major role in deer dynamics, by providing the seasonal moisture levels for plant growth and food production, for determining the season lengths and severity, the duration of standing water, and the rate of annual dry out.

a. Drought: Drought seems to be a regularly occurring phenomenon, on a 7 to 10 year cycle, with a 2 to 3 year duration.

Historically, deer observations during drought indicated that entire populations suffered from severe food competition which resulted in malnutrition, and large die-offs if it continued for any length of time. Fawn mortality was high.

Presently, in low population areas, drought conditions appear to increase fawn survival. This makes no sense, except under a viral disease scenario, where deer population levels are regularly suppressed (die-off) to levels below the vegetative response level (plenty of food and body fat), and viral transfer mechanisms (midges) are dried up early resulting in lower disease transfer and deer loss. It could also relate to the movement of livestock from depleted ranges to new pastures as potential roving disease reservoirs.

Early drought would limit stagnant water periods and blood feeding midge production, and thus limit transfer periods of virus to deer, when and where the virus is present.

b. Early storms: The limiting season here is related to storm systems followed by warm temperatures and rapid dry out. It was thought that the rapid dry-out limited greenfeed production needed for fawns during the spotted phase (first 2 months), since the dry-out generally occurs before the majority of fawns have lost their spots. While it is still considered a factor, this is also a period of blood feeding insect and disease production.

All migration is local, and extended freezes are rare. All water periods followed by warm temperatures produce blood feeding insects.

c. Mild winters: Most winters are mild here, with typical mediterranean climate. A mild winter would indicate warmer temperatures, early midge production, and possibly early dry-out, depending on precipitation levels. Cold periods would limit transmission, also.

2. Predators: In general, predators do not control game population levels, but rather the size of the prey base determines predator levels. Population curves clearly indicate that predator growth and decrease curves follow those of the prey species, at later dates.

Mountain Lions: The moratorium on mountain lions has resulted in increases in many areas, as witnessed by increases in the reported public observations, and increased depredation reports. The lion is dependant upon deer which is its primary food supply.

That lions should take more deer now, than during the previous periods when they were hunted heavily, is no surprise. These changes are probably increasing predation rates in some areas and could be locally important, on a temporary basis. The two populations will eventually balance with one another, except in areas with regular disease production.

The die-off of a lions' food supply, particularly at levels similar to the Clearlake loss, would mean both greater movement for the lion, and heavier proportional losses of surviving deer. Herd impacts could be additive in these areas.

The impact of lions on overall deer ranges, is considered of minor importance in herd dynamics.

However, the desired management programs for deer hunting, which recognize the management of habitats and control of mortality factors for maximum deer production, also aid in the management of lion populations.

Coyotes: Old wiley is still blamed for the major impacts on the deer herds by some folks. There is no doubt that they take a goodly number of deer each year, but the question now is really, "what came first, starvation and disease, or predator capability?" There is great doubt that the coyote has recently come up with more successful hunting techniques.

The long term evolution of the two species together indicates that they (predators) do not control deer dynamics. Current land use practices, however, are responsible for conditions which do influence predator capability. (see E, Range conditions)

There are large volumes of deer parts found in coyote dens, in many range units. The presence of these parts does not indicate how the deer died, or whether they were struggling with the incapacitation of starvation, or viral disease which is more probable.



Bobcats: The annual take of deer by bobcats is low, and not considered a factor in deer response.

There are no other natural predators of concern. Dogs are of major concern, when they run free.

### 3. Disease:

Viral disease is presently considered the primary killer of deer and the most significant impact on herd dynamics in the low population regions of the herd sub-units, and also functions in other areas irregularly, depending on overall water conditions, midge production, livestock use, and viral presence.

There are two viral diseases presently recognized locally: "Bluetongue" (BT) and "Epizootic Hemorrhagic Disease" or EHD. Bluetongue is caused by a virus that is classified within the Orbivirus genus in the family Reoviridae. Also within this genus, and antigenically closely related to BT virus, is EHD. This virus can cause disease which is clinically indistinguishable from bluetongue. For all practical purposes, they are discussed together. There is presently some question as to the effects and functions of the differing strains, however, there is little doubt that one or both of these virus, or mutations, are deadly to deer.

For deer, the disease is hundreds of times "hotter" than aids in humans. Full infection is generally within 7 days of contract, with full effect felt within 10 to 12 days, resulting in death, possible sterility, or abortion. There is no data on levels of survival of either healthy or sterile individuals.

Bluetongue is an arthropod-borne viral disease of ruminants characterized by congestion of the buccal and nasal mucosa and coronary tissue of the hooves, stiffness due to muscle degeneration which also results in arched neck, and fetal abnormalities with infection during pregnancy. All ruminant species are suspected as susceptible, but sheep exhibit more severe clinical symptoms than other domestic species. Depending on the viral strain and geographic area, morbidity can run as high as 80% of the flock, and mortality as high as 50%. Deer are even more sensitive.

The primary transfer mechanism is the biting midge (no-see-um) of the genus Culicoides, broken down into two species, C. occidentalis and C. variipennis, both of which can pass the virus. C. occidentalis is the serious man biter. Other vector species are still being evaluated.

Documented viral presence has been noted for Culicoides spp., sheep keds (Melophagus ovinus), and soft bodied ticks (Ornithodoros coriacius) which are known as "Pajawela" ticks.

The soft bodied tick can hold virus for up to 105 days or long enough to be a serious reservoir between the average storm cycles, and grazing periods.

Analysis of the recent die-off in Clearlake, indicated:

1. Herd control: Large numbers of deer can die rapidly under certain viral conditions, and that this disease has the capability of reducing herd levels significantly.

2. Sterile survivors : Fresh buck carcasses were necropsied during the die-off and found to have classical viral disease symptoms. Several (3) had hemorage involvement in the testes. There are several ramifications to this finding.

Stags: This is the first disease, to my knowlege, to exhibit the conditions necessary to create the "stag" or sterile buck phenomonon. Stags may be the sterile survivors of viral attack, and explain where the stag condition comes from. This condition has been known for decades, but never identified by cause.

The stag condition is known to occur in regular patterns and it is scattered throughout the western states. There are many hunting clubs which annually kill from 1% to 5% or greater stags.

Field evidence indicates at least three antler conditions to occur with stags; Hard antlers which never fall off, velvet which never stops growing, and no antlers.

This would indicate that the infection can occur at different seasons, and has differing effects, or is caused by differing virus. It also corresponds to midge hatch periods, which occur from March through November. (Lake Co. Mosquito Abatement)

Herd sterility: If the stag condition represents sterile male survivors, how about sterile female survivors? The die-offs tend to impact all age classes and sexes, and there does not appear to be major differences between male and female succceptability.

There could be an equal number of does which are likewise sterile. This could account for the notion that there are "non-breeding does", which are really non-fertile.

A percentage of both buck and doe sterility would supress deer response and better profile present herd conditions.

The occurance of "hot" periods of transmission, coupled with sterile adults, particularly females, could easily account for the rapid declines in the deer herds in many areas, and explain slow recovery rates. Studies are needed to profile and evaluate these factors.

It is interesting to note that the range areas which have the lowest populations, occur in a zone which has numerous vernal pools, vernal lakes, stagnating ponds, and is heavily grazed.

In contrast, areas which contain the highest populations, do not have livestock grazing. Grazing was removed from the Geysers some 10 years ago, and deer recovery has been at rates comprable to the "normal" deer response. There are vernal pools present.

4. Parasitism: Parisitism tends to influence herd health under high stress conditions, as during starvation die-offs. They are not generally a problem with, or influence deer numbers to any degree. Heavy flea infestations occur in some areas annually, during dry conditions.

The "pajawela" or Mammal Soft Tick could be a vector and reservoir for viral disease, and would explain the lower transmission rates and presence of bluetonge in non-grazed areas. Deer could also transport this species from grazing to non-grazing areas.

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### C. Effects of Current Deer Hunting and Proposed Hunting Strategies

#### 1. Effects Upon Species of Special Concern:

The hunting of deer does not effect any known species of special concern. Seasons occur in summer and fall, outside of reproduction cycles and sensitive periods for other species.

The management of habitat for deer, however, promotes habitat diversity and plant community edge, which are key factors in wildlife diversity and abundance. Greater deer numbers also means greater lion and other predator numbers.

The reduction of deer numbers prior to annual limiting seasons, helps reduce competition for acorns, reduces deer browse levels on vegetation, reduces additional consumption of marginal value plant species, and better balances range conditions. Acorn availability is important to numerous bird and animal species.

a. Changes in local populations: Minor positive benefits. Probably increases squirrels, pigs, woodpeckers, flickers, band tailed pigeons, rodents, ground mammals, and other acorn users. Field surveys do not include population monitoring on most non-game species. There are no known negative impacts.

b. Changes in Regional and Statewide populations: As above.

#### 2. Effects Upon Other Wildlife Species: As above.

a. Changes in local populations: No known negative impacts.

b. Changes in regional and state populations: No known negative impacts.

c. Changes in health, condition and age class structure of populations: No known negative impacts.

d. Changes in mortality factors: No known negative impacts.

### 3. Changes in Public Use/Recreation

a. Hunting: The drop of deer herd numbers in many of the public hunting areas has caused a gradual loss of deer hunters and license sales. These reductions mean less deer work and related wildlife management capability, which is at minimum levels now..

b. Non-consumptive: Increases in non-consumptive use are paralleling human growth rates and increasing rapidly.

Many non-consumptive users recognize the value of harvest for improving herd balances and health, and support hunting though they don't participate directly.

The change in the A/B zone boundaries helped place the Lake Pillsbury unit in a later season, which made the area more available to other recreation during the summer thus reducing conflicts, and giving hunters less camping competition during the fall when the others returned to school and normal work routines. More controlled units would be desirable, but require personnel to manage.

c. Nonhunting: There is an ever increasing nonhunting public, with increasing human populations. The nonhunting public has a right not to hunt. The decision to, or not to hunt should be individual.

There is a very vocal and disruptive group of nonhunting public which appears to be functioning out of emotion rather than reason. They are not satisfied with the evidence that hunting is beneficial to the naturally erupting species, nor do they relate to the more ancient understandings of the American Indians, which honored the species and hunted it in reverence for both their benefit, and set fires to renew food conditions.

This is the basis for the "sportsman" attitude, which seeks and enjoys the species in its natural surroundings, collects an animal for personal sustenance at levels which stimulate regrowth, and give thanks for the miracle of their life with every meal. It is a reverent and personal activity, where the taking of a few is intended to aid the many. That is the "Totem." Hunters who do not understand this and kill for pleasure without use, are not sportsmen.

The nonhunting public should not attempt to change this opportunity and right for others, particularly when there is historical, biological, and environmental basis for the action. They should be prepared for unsightly die-off, heavy depredation of gardens and landscaping, large numbers of sick deer, and major increases of parasites.

#### 4. Effect Upon Human Populations

a. Housing: Hunting is not a compatible activity within most subdivisions. Most Cities have firearm ordinances to prevent such activities. It generally presents real herd control problems. The lack of hunting in many developed areas is more often a problem for landscape, particularly roses and gardens, and unsightly deer die-offs resulting from starvation are highly visible. There is presently a great need for urban and semi-rural wildlife control units to be able to handle the present problems.

Pet dogs, however, can have serious impacts on deer when allowed to run free.

b. Transportation: Hunting helps to reduce the potential numbers of deer on the highways by slight amounts. Deer are annually involved in hundreds of collisions, generally because people drive too fast.

c. Public Services: Hunting on public lands adds some costs to the local public services, by increasing the overall number of persons using recreation facilities and roads. Deer hunters also add to the local economy by using local products.

d. Energy: Hunting has little relationship to energy, other than gas consumption. Many hunters expend a great deal of energy hunting.

e. Human Health: Present hazards to human health are generally with the hunter at risk. They include accidental shooting, injury from unexpected falls, rattlesnake bite, parasite pickup, lyme disease from infected ticks, reaction to insect bites and plants, becoming lost, and overexposure.

Hunter safety classes have helped relieve the incidence of accidents, and raised hunter conscienceness to safety procedures and practices. Regular health checkups are recommended.

f. Aesthetics: Hunting is an aesthetic experience if practiced with the sportsman attitude. Where hunting is not an esthetic quality when mixed with other recreation types, there is an attempt to provide scheduling which allows all use types with minimal overlap and interaction.

As the lake Pillsbury example done with a zone change.

g. Cultural Resources: Hunting is itself a cultural resource. The practice is as old as mankind, and our history has been one to try to understand the process and manage the capability, to provide the same opportunities to future generations. There is much to be learned about the self by participating in the process.

D. Range ownership: The changes in ownership patterns go slowly in Lake County. There are few changes since the plan date, with large tracts of public land and large private ranches engaged in livestock production still dominant.

There is a proposal for major subdivision in the heart of the Guenoc Ranch, and reductions in grazing in the geysers.

E. Range conditions: Most range conditions are similar to those last reported.

1. Fire: Controlled burning continues to aid vegetation regeneration and provide wildfire protection. This is a valuable program for deer management. Geysers mitigations included burning and brush crushing in chaparral units, with good deer response. The County/State/Federal resource area burning programs have modified hundreds of acres with varying deer herd response, depending on the sub-unit.

Wildfires burned large acreages in the Snow Mountain and south-eastern areas, but burn mosaics were generally good. Deer response is not evident in this area, and populations remain in very low numbers.

2. Livestock Grazing: Livestock grazing is having serious impacts on deer herds where open range practices are followed.

There is direct competition with major tree species, and a significant lack of replacement. Most grazing ranges do not have replacement trees and stands are getting old and falling down. The reductions in oaks is of serious concern to deer and numerous other wildlife species.

Livestock grazing in waterways is removing the trees, shrubs, all soft greenfeed, and destroying the critical stream "oasis" condition which provides critical summer cooling, food and moisture for fawning, resting and escape cover.

The loss of cover and feed requires deer to travel further for their needs, and increases predation rates. The grazer aids coyote impacts.

Livestock are attributed as the major introduction source of tropical and sub-tropical viral diseases, and a continuing source of transfer with animal movements from range

to range. They were introduced into local habitats containing vernal basins and seasonally stagnating watering ponds which contain blood feeding midges, and ticks.

Livestock are known carriers of EHD and BT, and are not generally as sensitive to the diseases as are deer. The practice of moving livestock from range to range is probably spreading the diseases regularly. They could either be viral carriers, or carry ticks which are viral reservoirs, or both.

The relative abundance of deer and the incidence of viral die-off is closely related to the distribution of vernal waters and livestock grazing units.

Grazers on public lands need to go through inspections prior to relocation to prevent further spread.

3. Logging: Logging practices include both limiting and expanding practices, and it depends on which are utilized.

In general, opening up dense timber stands tends to increase shrub and forb production and increase forage supplies for deer. Such removal in waterway corridors damages protective canopies, allows more rapid dry out, and generally damages the critical "oasis" conditions during hot periods.

The clear cutting of oaks removes acorns, likens, leaf litter and diversity. It is a negative impact on deer and on erupting conifers. Maintenance of oak communities should be a major program goal.

Habitat diversity is a key to wildlife diversity and deer management. Deer are edge species, which thrive on high edge components. Most tree farming removes these edges and reduce deer capacity. The largest problem with logging practices is their monotypic objectives and lack of overall area management for species diversity. That, and unrealistic harvest levels. Deer hunting is influenced in ever changing patterns in logging areas. The systems are so complex with multiple use, that field studies are needed to sort out the real impacts. The use of herbicides is considered madness.

#### F. Hill Bill Projects Planned and Proposed

1. Habitat Manipulation projects: These are important in normally responding herd units. They are presently thought to be of minor importance to viral disease study.

2. Investigative Projects: The study of bluetongue is considered the most critical present need. If Hill Bill funds do not allow for major study effort, then special funds should be obtained for the purpose.

There is a need to profile herd dynamics; the identification of herd units and densities, local vector species location and production, vernal pool and deadwater distribution, livestock grazing areas and health, viral occurrence, predator densities, area comparisons, etc.

We need a technical aid full time just in Lake County to respond to deer calls, necropsy dead animals and profile local conditions. The use of highway kill deer for analysis could provide the basis for viral presence, parasite associations, and herd fertility.

I believe that lake County is an ideal study area since it contains highly diverse habitats and deer density units, and continuing die-off. It also contains some of the most vociferous deer sportsmen in the State, which need to know we are as concerned as they are.