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STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

CALIFORNIA CONDOR RANGE LAND USE STUDY^{1/}

by

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ABSTRACT

Study was initiated to document land use within the California condor range. Objectives were to determine: (1) Ownership of land, (2) Land use changes for the years 1950, 1960 and 1970, (3) Land use changes of three intensive condor activity regions and (4) Predict land use changes within the California condor range for the years 1980 and 2000.

Of the 10,816,000 acres within the California condor range, 6,950,000 acres (64%) are privately owned and 3,866,000 acres (36%) are owned by public agencies. Of the public agencies the U.S. Forest Service is the principle landowner with 2,984,000 acres (28%) of the condor range. Land use classifications were divided into five main categories: (1) Agriculture, (2) Urbanization, (3) Native vegetation class land, (4) Reclamation and (5) Unclassified.

Native vegetation, the principle land class, decreased 309,000 acres (4%) between 1950 and 1960 and decreased 380,000 acres (5%) between 1960 and 1970. Agriculture acreage increased 220,000 acres (43%) between 1950 and 1960 and increased 288,000 acres (40%) between 1960 and 1970. Urbanization between 1950 and 1960 increased 49,000 acres (61%) and from 1960 to 1970 increased 93,000 acres (72%). Future trends were determined in land

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use change for regions of intensive condor use. It is predicted that the trend in land use changes will continue to the years 1980 and 2000 at a rate similar to that occurring from 1950 to 1970.

INTRODUCTION

The California condor (Gymnogyps californianus) is the largest land bird in North America with a wingspread of over nine feet and a weight of twenty to twenty-five pounds. The first documented sighting of the California condor was in 1602 by Father Antonio de la Ascension at Monterey Bay, Monterey County, California (Koford, 1953).

Little was known on the life history and status of the California condor until studies in the early 1950's by Koford. As a result of these studies the California Legislature fully protected the condor in 1957. A survey by Miller, et al., (1965) indicated that a 30 percent reduction in the condor population occurred between the early 1950's and early 1960's. The present condor population is estimated at 50-60 birds (Mallette, 1970). By California Fish and Game Commission action in 1971, the California condor was placed on the endangered species list.

Objectives

There are many factors to consider when evaluating the cause of the declining condor population. This study was initiated to document land use within the California condor range because suitable habitat is an important factor affecting the survival of the condor. Study objectives were to:

- (1) Determine ownership of lands within the condor range, (2) Identify land uses within the condor range and changes for the years 1950, 1960 and 1970, (3) Determine land use of intensive condor use areas and changes of land use in these areas, and (4) Estimate land use changes for the years 1980 and 2000.

METHODS

This study is primarily concerned with land use classification within the California condor range. Condor range as delineated by Wilbur, et al., (1972) extends south along the western slope of the Sierra Nevada Mountains from Madera County to the Tehachapi Mountains of Kern County, then west along mountainous areas of Los Angeles, Ventura and Santa Barbara Counties; north along the coastal mountains to Santa Cruz and Santa Clara Counties (Figure 1). Ownership information was obtained from the Comprehensive Framework Study (1971).

A compilation of land use data for the period 1950-1960 was obtained from U. S. Geological Survey maps, 7-1/2' quadrangles. Land use acreage in 1970 was obtained from land use studies by the California Department of Water Resources. Land use acreage was determined by placing a transparent plastic grid overlay on 7-1/2' quadrangle maps. The grid was divided into one centimeter squares, each square equalling 10 acres. Land use data was tabulated for each 7-1/2' quadrangle or portion falling within the condor range.

There were five land classifications used by the California Department of Water Resources. The classifications are as follows:

- (1) Agriculture - land used for cultivation of crops to meet man's demands for food and clothing. This includes grain, field crops, pasture, truck and berry crops, deciduous fruits, nuts and vineyards.
- (2) Urbanization - land used for residential, commercial and industrial purposes which enables man to meet other survival needs.
- (3) Native vegetation - land not used directly by man and consisting of native vegetation and water surfaces. This includes grass land, brush, forest, meadows, riparian lands, lakes, rivers and reservoirs.

- (4) Reclamation - land being leached for the removal of harmful salts.
- (5) Unclassified - lands which have not been classified as one of the above but, in general, fall into native vegetation class.

Predictions of land use changes for the years 1980 and 2000 were based on changes which occurred from 1950 to 1970.

RESULTS

The California condor range (Figure 1) consists of 10,816,000 acres.

Ownership

Of the 10,816,000 acres within the California condor range 6,950,000 acres (64%) are privately owned and 3,866,000 acres (36%) are owned by public agencies as shown in Table 1. The U. S. Forest Service is the largest landowner of the public lands administering 2,984,000 acres (28%) of the condor range. Next in order are the Bureau of Land Management with 519,000 acres (5%), the Department of Defense with 343,000 acres (3%), the National Park Service with 18,000 acres, and the Bureau of Indian Affairs with 2,000 acres.

TABLE 1

Landownership Within the California Condor Range, 1970

<u>Ownership</u>	<u>Acreage</u>	<u>Percentage</u>
Private ^{1/}	6,950,000	64
Forest Service	2,984,000	28
Bureau of Land Management	519,000	5
Department of Defense	343,000	3
National Park Service	18,000	trace
Bureau of Indian Affairs	<u>2,000</u>	<u>trace</u>
	10,816,000	100

Land Use

Land use within the California condor range is summarized in Table 2 for the years 1950, 1960, and 1970. Appendix Table 1 provides a summary by county.

TABLE 2

Land Use Acreage Within California Condor Range
1950 - 1970

<u>Land Class</u>	<u>1950</u>		<u>1960</u>			<u>1970</u>		
	<u>Acres</u>	<u>%</u>	<u>Acres</u>	<u>%</u>	<u>% Change from 1950</u>	<u>Acres</u>	<u>%</u>	<u>% Change from 1960</u>
Agriculture	507,000	5	727,000	7	+43	1,015,000	9	+40
Urbanization	80,000	1	129,000	1	+61	222,000	2	+72
Native Vegetation	7,381,000	68	7,072,000	65	-4	6,692,000	62	-5
Reclamation	1,346,000	12	1,386,000	13	+3	1,385,000	13	-
Unclassified	<u>1,502,000</u>	<u>14</u>	<u>1,502,000</u>	<u>14</u>	-	<u>1,502,000</u>	<u>14</u>	-
	10,816,000	100	10,816,000	100		10,816,000	100	

^{1/} Includes checkerboard pattern areas of private and Bureau of Land Management lands in which there is less than 50 percent Bureau of Land Management land.

Large amounts of native lands with suitable nesting, resting and foraging areas are essential for the survival of the condor. Principle land use falls in the native vegetation classification. When grouping the unclassified land class, primarily native vegetation, with native vegetation land class, over 76 percent of the condor range was in the native vegetation class in 1970.

Rate of change in land use from native classes to agriculture and urbanization classes since 1950 is apparent in Table 2.

Throughout the entire condor range there has been increases in uses for agriculture and urbanization land classes. Naturally, accompanying the above increases the native vegetation class has to decrease. Between 1950 and 1960 agriculture land class increased 220,000 acres (43%) and between 1960 and 1970 increased 288,000 acres (40%). There was an increase of 49,000 acres (61%) between 1950 and 1960 in urbanization and between 1960 and 1970 there was a 93,000 acre (72%) increase. The native vegetation land use class decreased 309,000 acres (4%) between 1950 and 1960 and between 1960 and 1970 there was a 380,000 acre (5%) decrease.

Intensive Condor Use Areas

There are three areas within the condor range which are more intensely used by condors (Figure 2). The following are results of an evaluation of land use data for these regions for 1970.

Southern Region

The southern region consists of portions of Santa Barbara, Ventura and Los Angeles Counties in the southern portion of the condor range illustrated in Figure 2.

TABLE 3

Land Use Acreage, Southern Region of
California Condor Range - 1950-1970

Land Class	1950		1960			1970		
	Acres	%	Acres	%	% Change from 1950	Acres	%	% Change from 1960
Agriculture	35,000	1	106,000	4	+203	135,000	5	+27
Urbanization	20,000	1	63,000	2	+215	115,000	5	+83
Native Vegetation	1,596,000	63	1,483,000	59	-7	1,402,000	55	-5
Reclamation	115,000	5	114,000	5	-	114,000	5	-
Unclassified	<u>771,000</u>	<u>30</u>	<u>771,000</u>	<u>30</u>	-	<u>771,000</u>	<u>30</u>	-
TOTAL	2,537,000	100	2,537,000	100		2,537,000	100	

Between 1950 and 1960 there was a 71,000 acre (203%) increase in agriculture land class and between 1960 and 1970 there was a 29,000 acre (27%) increase (Table 3). Urbanization land class increased 43,000 acres (215%) between 1950 and 1960 and between 1960 and 1970 there was a 52,000 acre (83%) increase. Native vegetation land class decreased 113,000 acres (7%) during the period between 1950 and 1960 and between 1960 and 1970 there was an 81,000 acre (5%) decrease.

Southern Kern County Region

The second important region of condor use consists of 305,000 acres in southern Kern County. Winter's Ridge, Grape Vine, Cummings Mountain, Pastoria Creek, Tejon Hills and Tejon Ranch 7-1/2' quadrangle topographic map contain area in the Southern Kern County region.

TABLE 4

Land Use Acreage, Southern Kern County
Region of California Condor Range
1950-1970

Land Class	1950		1960			1970		
	Acres	%	Acres	%	% Change from 1950	Acres	%	% Change from 1960
Agriculture	10,000	3	12,000	4	+20	17,000	5	+42
Urbanization	15	-	39	-	+160	51	-	+31
Native Vegetation	128,000	42	126,000	41	-2	121,000	40	-4
Reclamation	144,000	47	144,000	47	-	144,000	47	-
Unclassified	<u>23,000</u>	<u>8</u>	<u>23,000</u>	<u>8</u>	-	<u>23,000</u>	<u>8</u>	-
TOTAL	305,000	100	305,000	100		305,000	100	

Between 1950 through 1960 there was a 2,000 acre (20%) increase in agriculture land class and between 1960 and 1970 there was a 5,000 acre (42%) increase (Table 4). Urbanization land class between 1950 and 1960 increased 24 acres (160%) and between 1960 and 1970 there was a 12 acre (31%) increase. The native vegetation land class had a 3,000 acre (2%) decrease between 1950 and 1960 and between 1960 and 1970 there was a 5,000 acre (4%) decrease.

Sierra Nevada Region

The last important region of condor activity is divided. The region is located in the Sierra Nevada Foothills. For this region of 469,000 acres, the following 7-1/2' quadrangles topographic map areas used were: White River, Gibbon Peak, California Hot Springs, Woody, Glennville, Success Dam, Springville, Globe, Stokes Mountain, Auchland, Tucker Mountain and Miramonte.

Agriculture land class during the period of 1950 to 1960 decreased 6,000 acres (60%) and between 1960 and 1970 there was a 3,000 acre (75%) increase

(Table 5). Urbanization land class had an increase of 1,390 acres (388%) between 1950 and 1960 and between 1960 and 1970 there was a 1,000 acre (50%) increase. Native vegetation land class increased 4,410 acres (1%) between 1950 and 1960 and between 1960 and 1970 there was a 4,000 acre (1%) decrease.

TABLE 5

Land Use Acreage, Sierra Nevada Region
of California Condor Range
1950-1970

Land Class	1950		1960			1970		
	Acres	%	Acres	%	% Change from 1950	Acres	%	% Change from 1960
Agriculture	10,000	2	4,000	1	-60	7,000	1	+75
Urbanization	410	-	2,000	-	+388	3,000	1	+50
Native Vegetation	416,590	89	421,000	90	+1	417,000	89	-1
Reclamation	42,000	9	42,000	9	-	42,000	9	-
Unclassified	-	-	-	-	-	-	-	-
TOTAL	469,000	100	469,000	100		469,000	100	

Predicted Land Use

It is predicted that the trend in land use changes will continue at a rate similar to that occurring from 1950 to 1970. Table 6 summarizes the changes which were predicted for the years of 1980 and 2000.

TABLE 6

Predicted Land Use Acreage,
California Condor Range
1970-2000

Land Class	1970		1980			2000		
	Acres	%	Acres	%	% Change from 1970	Acres	%	% Change from 1980
Agriculture	1,015,000	9	1,127,000	10	+11	1,681,000	16	+49
Urbanization	222,000	2	352,000	3	+59	777,000	7	+121
Native Vegetation	6,692,000	62	6,450,000	60	-4	5,471,000	50	-15
Reclamation	1,385,000	13	1,385,000	13	-	1,385,000	13	-
Unclassified	<u>1,502,000</u>	<u>14</u>	<u>1,502,000</u>	<u>14</u>	-	<u>1,502,000</u>	<u>14</u>	-
TOTAL	10,816,000	100	10,816,000	100		10,816,000	100	

Prediction of land use changes in the condor range follows the trends of increased acreage for agriculture and urbanization land classes. Native vegetation land class predictions reflected a decline in acreage as lands are developed. Between 1970 and 1980 it is estimated there will be an increase of 112,000 acres (11%) in agricultural acreage and between 1980 and 2000 an increase of 554,000 acres (49%) is predicted. Urbanization land class may increase 130,000 acres (59%) by 1980 and between 1980 and 2000 an increase of 425,000 acres (121%). Native vegetation land class acreage is estimated to show a decline of 282,000 acres (4%) by 1980 and an estimated reduction of 939,000 acres (15%) between 1980 and 2000.

Analyzing the results of the land use study, it is readily apparent that acreage suitable to the condor, native vegetation class lands, is declining while the

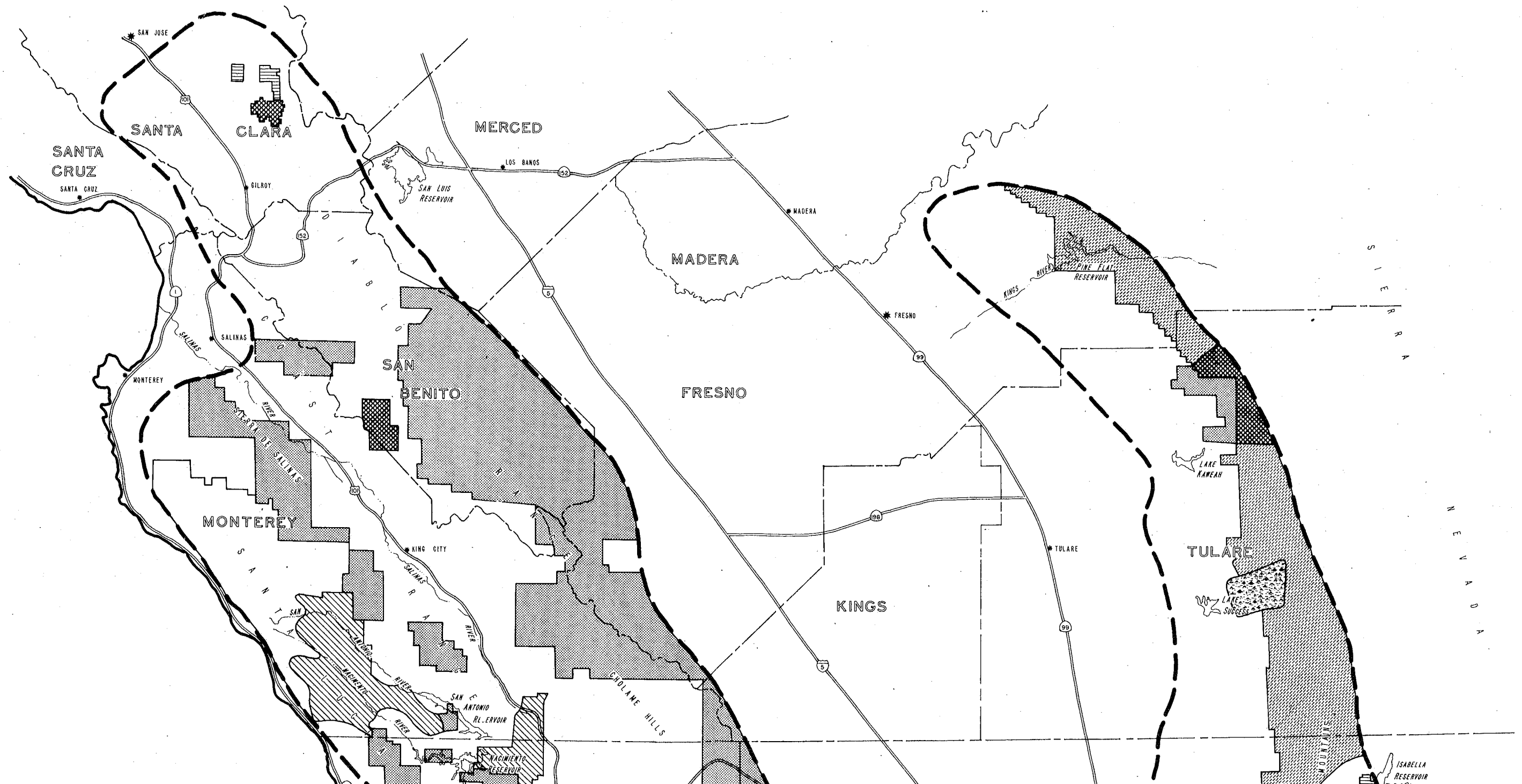
agriculture and urbanization is rising. Although there appears to be adequate open space for the California condor, there is a need to study subtle changes that are taking place within native vegetative class lands not available in these data. Land use changes in areas of intensive condor use are extremely important to the survival of the California condor.







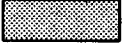
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Figure 1

LAND OWNERSHIP WITHIN THE CALIFORNIA CONDOR RANGE



- LEGEND**
- CONDOR RANGE BOUNDARY LINE
 -  BUREAU OF LAND MANAGEMENT
 -  FOREST SERVICE
 -  NATIONAL PARK SERVICE
 -  DEPARTMENT OF DEFENSE
 -  BUREAU OF INDIAN AFFAIRS
 -  PRIVATE LANDS
 -  LESS THAN 50% B.L.M.

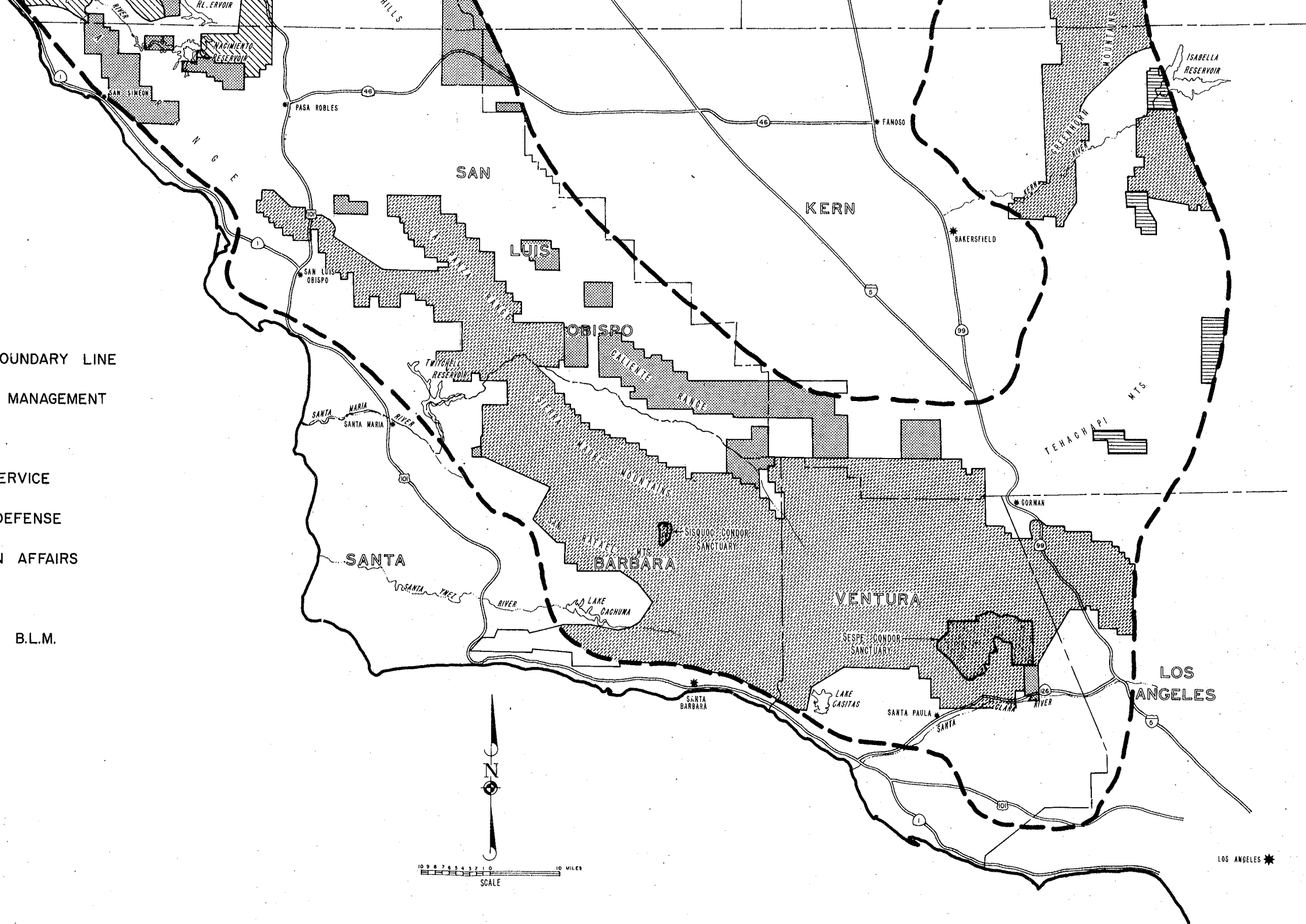
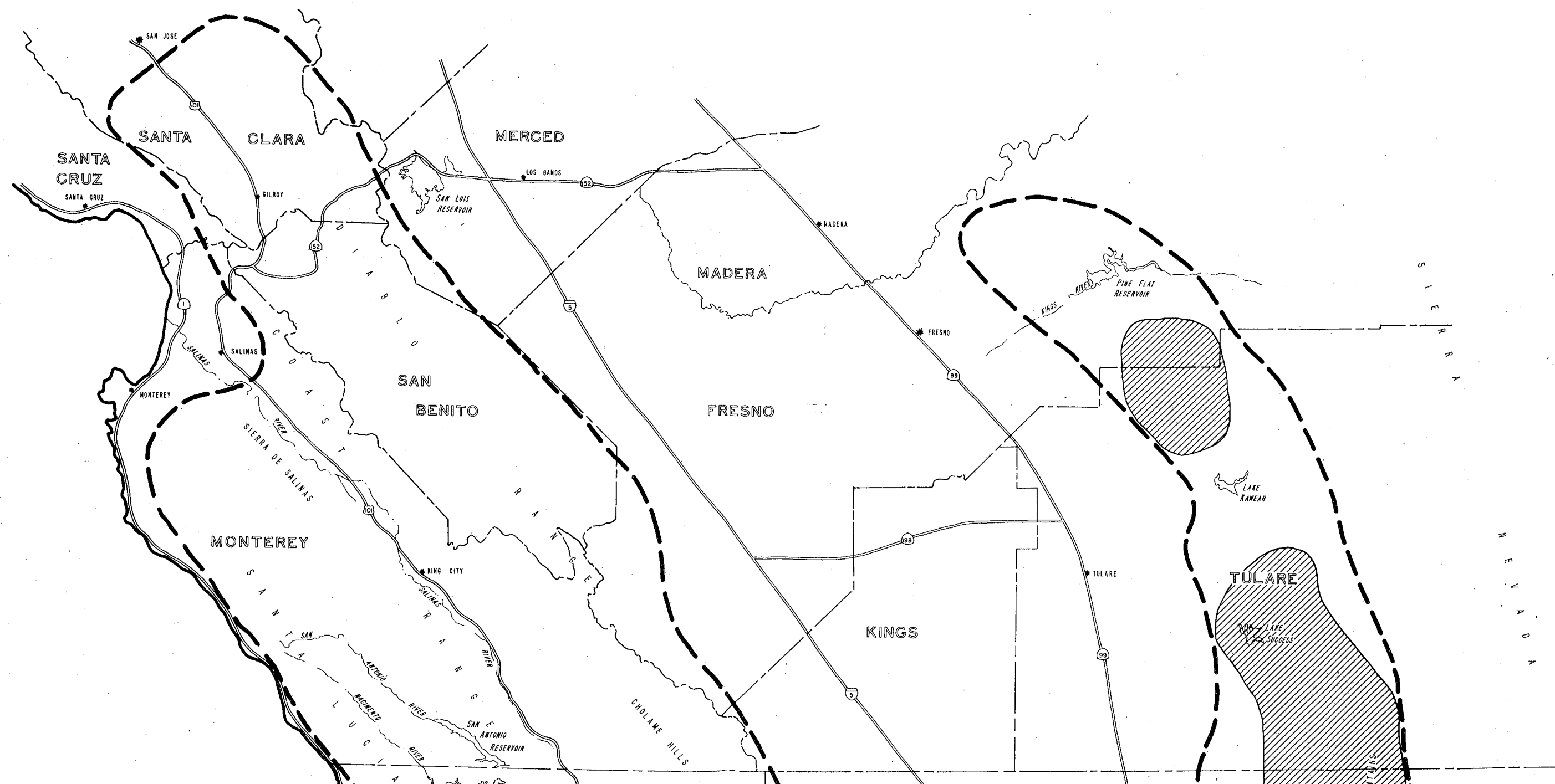
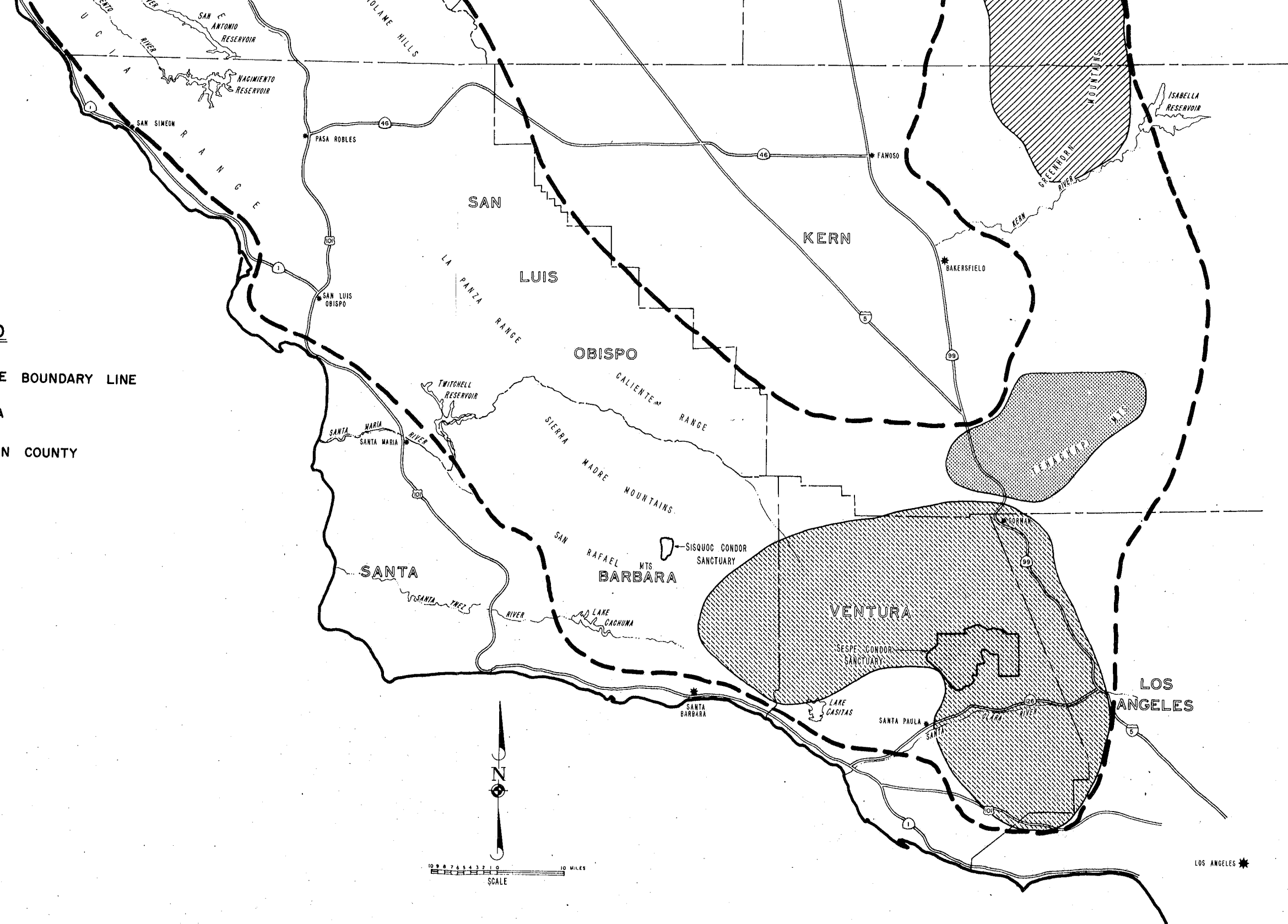


Figure 2

INTENSIVE CONDOR USE REGIONS WITHIN THE
CALIFORNIA CONDOR RANGE
1970



- LEGEND**
- CONDOR RANGE BOUNDARY LINE
 - ▨ SIERRA NEVADA
 - SOUTHERN KERN COUNTY
 - ▤ SOUTHERN



APPENDIX TABLE 1
LAND USE ACREAGE WITHIN CALIFORNIA CONDOR RANGE BY COUNTY
1950, 1960, AND 1970

LAND CLASS	FRESNO	KERN	LOS ANGELES	MONTEREY	SAN BENITO	SAN LUIS OBISPO	SANTA BARBARA	SANTA CLARA	TULARE	VENTURA	MERCED	SANTA CRUZ	STANISLAUS	TOTALS	ROUNDED TOTAL
1950-															
Agriculture	12,595	60,697	4,658	64,891	52,780	108,338	4,360	7,500	164,528	26,440	00	00	00	506,787	507,000
Urbanization	742	558	1,684	2,015	2,292	1,932	5,028	38,380	13,617	13,462	00	00	00	79,710	80,000
Native Veg.	402,486	721,757	131,242	1,818,059	578,188	1,207,569	750,376	49,260	570,153	714,629	18,000	59,750	59,750	7,381,219	7,381,000
Reclamation	64,030	447,348	14,879	179,681	242,890	211,226	38,480	39,700	26,880	61,385	00	9,750	9,750	1,345,999	1,346,000
Unclassified	00	76,890	173,878	57,784	00	596,735	230,046	00	00	366,764	00	00	00	1,502,097	1,502,000
TOTAL	479,853	1,307,250	326,341	2,122,430	876,150	2,125,800	1,028,290	131,840	775,178	1,182,680	18,000	69,500	72,500	10,815,812	10,816,000
1960-															
Agriculture	14,663	81,250	10,136	95,123	79,384	200,323	15,568	16,500	133,134	80,599	00	00	00	726,710	727,000
Urbanization	952	1,841	2,490	2,621	3,141	3,550	7,720	33,900	20,041	52,843	00	00	00	129,099	129,000
Native Veg.	400,208	699,891	125,008	1,787,275	550,735	1,113,966	736,476	21,740	595,123	621,615	18,000	59,750	42,500	7,072,287	7,072,000
Reclamation	64,039	447,348	14,829	179,627	242,890	211,220	38,480	59,700	26,880	60,859	00	9,750	30,000	1,385,619	1,386,000
Unclassified	00	76,890	173,878	57,784	00	596,735	230,046	00	00	366,764	00	00	00	1,502,097	1,502,000
TOTAL	479,853	1,307,250	326,341	2,122,430	876,150	2,125,800	1,028,290	131,840	775,178	1,182,680	17,000	69,500	72,500	10,815,812	10,816,000
1970-															
Agriculture	79,737	148,685	20,851	173,214	81,477	238,505	45,010	25,000	133,134	69,149	00	00	00	1,014,762	1,015,000
Urbanization	3,055	5,470	3,654	4,802	4,367	6,991	14,530	51,000	30,990	97,042	00	00	00	221,901	222,000
Native Veg.	334,031	628,857	113,129	1,719,865	547,416	1,072,343	700,224	82,640	584,174	588,866	18,000	59,750	42,500	6,691,795	6,692,000
Reclamation	611,030	447,348	14,829	166,765	242,890	211,226	38,480	73,200	2,580	60,859	00	9,750	30,000	1,385,257	1,385,000
Unclassified	00	76,890	173,878	57,784	00	596,735	230,046	00	00	366,764	00	00	00	1,502,097	1,502,000
TOTAL	479,853	1,307,250	326,341	2,122,430	876,150	2,125,800	1,028,290	431,840	775,178	1,182,680	18,000	69,500	72,500	10,815,812	10,816,000