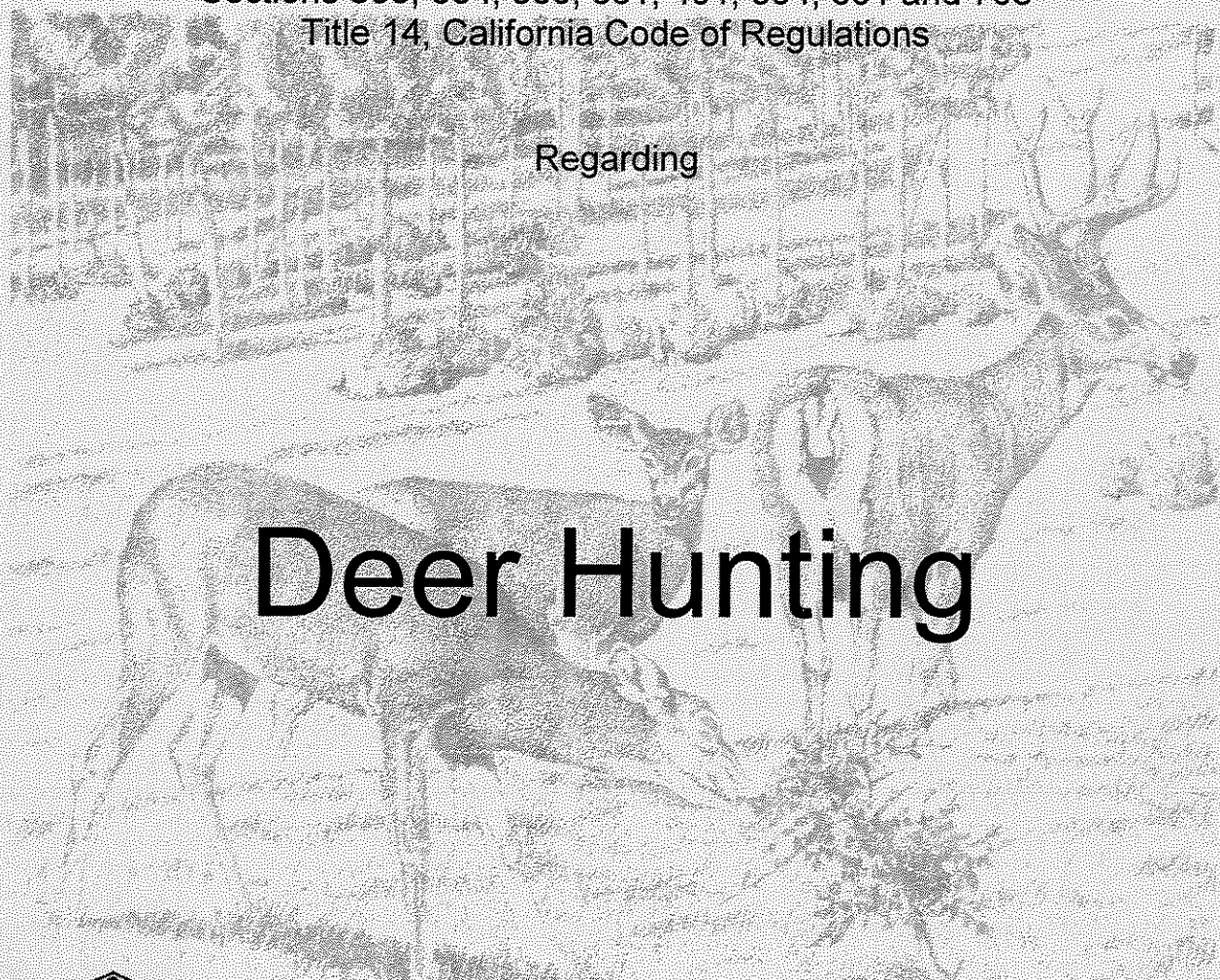
FINAL
ENVIRONMENTAL DOCUMENT

Sections 353, 354, 360, 361, 401, 554, 601 and 708
Title 14, California Code of Regulations

Regarding



Deer Hunting

April 12, 2004

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

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Recent statutory changes require the Fish and Game Commission (Commission) to review the mammal hunting regulations pursuant to Section 207 of the Fish and Game Code at least once every three years. With respect to deer hunting regulations, 2004 is the first year of this three-year cycle. In the first year of this three-year cycle, the Commission, at a public meeting in February, receives recommendations for changes in these regulations from the Department, other agencies, and the general public. Based upon input received at the March and April meetings, the Commission may adopt mammal hunting regulations, including those for deer. During the second and third years of the above described three-year cycle, the Commission receives proposals from the Department for changes in the mammal hunting regulations where take quotas are based on population performance, changes of an urgency nature for the good of the resources and changes for clarity. At this time, the Commission also considers continuing all other mammal hunting regulations in effect. Following receipt of public input, the Commission utilizes the authority of Section 220 of the Fish and Game Code to adopt the regulations. The proposed project, therefore, would adjust tags in each deer hunting zone and additional hunt; modify zone boundaries; modify seasons; and create new hunts; and modify regulations for clarity.

The State's wildlife conservation policy contains, among other things, an objective of providing sport hunting use of selected species where such use is consistent with maintaining healthy wildlife populations. The project being considered is a proposal to continue to implement hunting as an element of deer management. The objectives of the proposal are to maintain healthy deer herds and to provide public sport hunting opportunities through regulated harvest.

PROPOSED PROJECT

The Department is recommending that the Commission adopt regulations that will provide for limited public hunting of buck, antlerless and either-sex deer in a total of 44 hunting zones, 27 area-specific archery hunts, 43 additional hunts, 63 Private Lands Wildlife Habitat Enhancement and Management (PLM) Area Program hunts (PLM areas are licensed in May through September), and 10 fund-raising license tags. Hunter quotas are determined using annual deer herd survey data and state-of-the-art deer population modeling techniques. Primary input to these models includes the results of annual deer herd surveys, herd objectives contained in approved deer herd management plans, and both hunting and non-hunting mortality. Because final hunter quotas cannot be established until late March, when overwinter fawn survival is determined, the Commission is provided with a range of proposed hunting tag quotas. Upon completion of spring herd composition surveys, consultation with the Interstate Deer Committee and final population modeling, the Department will determine and recommend to the Commission final hunting tag quotas.

This document is an environmental impact analysis which is prepared and circulated in compliance with the California Environmental Quality Act (CEQA) (Section 21000, Public Resource Code). The document provides the Commission with a range of alternatives, such as optimum sustained yield (Department proposal), maximum sustained yield, and minimum harvest proposal. The effects of these alternatives have been assessed and evaluated. In addition, the Commission is specifically provided with statewide analysis of the no project (continuation of the previous years seasons and tag quota's), no archery, bucks-only, and no use of dogs alternatives.

PUBLIC INPUT AND AGENCY CONSULTATION

Deer herd management plans have been developed and approved for 80 recognized deer herds or groups of similar herds in the State. Both public and other agency (Federal and State) input played a role in the development of these plans. Their comments were addressed in each plan. The plans provide management objectives related to habitat and populations. Achieving the specific herd objectives identified in these plans is the intent of the proposed action.

CEQA encourages public input. One of the primary purposes of the environmental document review process is to obtain public comment, as well as to inform the public and decision makers. It is the intent of the Department to encourage public participation in this environmental review process.

Prior to preparing this environmental document, the Department developed a Notice of Preparation (NOP). In early November, the NOP was provided to the State Clearinghouse for distribution, as well as to land management agencies in California that have an interest, or play a key role, in deer management (including the U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), National Park Service (NPS), and U.S. Forest Service (USFS)). This NOP was also provided to individuals and/or organizations which expressed an interest in deer management in the past. The NOP requested that any comments regarding input to the environmental document be submitted to the Department within 30 days of receipt of the NOP.

The Department has also encouraged public input into the environmental document by scheduling a scoping session to discuss documents prepared in support of mammal hunting and trapping regulations. A scoping session was held December 11, 2003, in Sacramento.

The Department prepared a draft environmental document (DED) regarding deer management (sections 353, 354, 360, 361, 401, 554, 401, 554, 601, and 708, Title 14, CCR). The DED was made available for public review on February 6, 2004. It was mailed to 27 individuals and organizations who expressed interest in this issue. The individuals and organizations which received the DED are listed in Appendix 9. Additionally, notice of availability of the DED for public review was provided to the State Clearinghouse, which provided notice of availability to over 880 organizations, including all county governments in California. Notice of availability was also published in 24

major California newspapers. Each of the 24 newspapers has a daily circulation exceeding 50,000. The DED was also made available in the Department's six regional offices and in the Department's Bishop, Eureka, Menlo Park, and San Diego satellite offices. During the 45-day notice period the draft environmental document was available for public review and no comments were received regarding the document. Also, a letter was received from Ms. Terry Roberts, Senior Planner, State Clearinghouse, noting that the Department had complied with the CEQA review requirements for the draft environmental document and that no State agency comments were received.

AREAS OF CONTROVERSY

The Department has made every effort to disclose and address the areas of controversy in the environmental document. Areas of controversy were identified through public forums, scoping sessions, and comments submitted on past environmental documents. Based on these concerns, the Department has endeavored to include specific safeguards in the proposed action to avoid adverse environmental impacts and to address controversial issues. The following public comments regarding the sport hunting of deer have been brought to the Department's attention:

1. When compared to 40 years ago, the State's deer population is in trouble, relative to the size and condition of the herds.

2. The cumulative effects of drought, grazing, road kills, poaching, predation, disease and habitat loss are causing significant problems for deer statewide.

3. Current management (hunting regulations) offers permissive buck hunting (hunting in the rut, antler restrictions, high harvest rates), even where buck populations are severely depressed.

4. Hunting is intrinsically cruel and inhumane. Moreover, archery deer hunting leads to excessive wounding loss.

5. Late-season hunting of deer has a serious deleterious effect on both the social structure and genetic integrity of populations.

6. Poaching has a significant negative effect on the State's deer population.

7. Livestock grazing on public land (BLM and USFS) is having a significant adverse impact on deer habitat carrying capacity.

8. Deer mortality resulting from the issuance of depredation permits is having significant negative impacts on deer populations statewide.

9. The use of dogs to assist in taking deer has a significant negative effect on deer populations statewide.
10. Hunting deer under the PLM Program is having a significant adverse effect on the genetic viability of the deer populations statewide.

11. The hunting of deer (does and/or bucks) is a form of additive mortality, which contributes to higher rates of mortality and to the decline of deer populations.

12. Heavy snows and cold winter weather has a significant negative effect on deer populations.

13. Recently recognized adenovirus has had a significant negative effect on deer populations.

14. Off-highway vehicles (OHVs) and other human disturbance have a negative effect on deer populations.

15. Lack of antlerless harvest is negatively impacting herd health and habitats.

16. Predation by mountain lion and coyote is having negative effects.

17. Spent lead bullets/ammunition fragments have recently been identified as a potential source of lead poisoning in California Condors.

ISSUES TO BE RESOLVED

Issues to be resolved relate to the decisions regarding how to provide public hunting of deer as an element of deer management. Specific issues to be resolved include the establishment of specific hunt areas, season dates, bag and possession limits, hunter quotas, special conditions and methods of take. Additionally, the issue of whether to adopt the proposed project or an alternative needs to be resolved.

CONCLUSION

Sport hunting is a controversial issue. A segment of the public has contended that the loss of a single animal by hunting is a significant impact by virtue of the mortality of the individual. Because the activity of hunting deer will result in the death of individual animals, specific safeguards are included in the proposed action. These safeguards include limited quotas, specified seasons, bag and possession limits and herd monitoring, which should result in removing deer at a level that is consistent with individual herd performance. Therefore, the proposed actions have been designed to avoid significant adverse effects on the environment.

The removal of individual animals through hunting, together with other natural mortality, from any of the deer herds, should not significantly reduce herd size over the annual cycle. The proposed action is expected to result in maintaining the herd ratio objectives around the approved management plan objectives. The production and survival of young animals within each herd should replace the animals removed by hunting. Therefore, the proposed action of harvesting deer by hunting should not have a significant adverse impact on either local populations or the statewide population of deer beyond the annual cycle.

CHAPTER 1. PROPOSED PROJECT

The objective of the project is to provide public hunting of deer in 44 hunting zones, 27 area-specific archery hunts, 43 additional hunts, 63 PLMs, and 10 fund-raising license tags with rifles, pistols, and revolvers using centerfire cartridges with softnose or expanding bullets, shotguns, bow and arrow, muzzleloading rifles, and crossbows. This chapter describes proposed seasons, bag limits, number of tags, special conditions, and herd statistics for the hunt areas. Additionally, information is provided on quotas, methods of take, tag application procedures and use. General zone, area-specific archery, and additional hunt area boundaries are provided in this chapter and Appendix 6. Finally, a complete review of herd size and herd performance by hunt zones are described in Table 1-1. For additional information on the proposed project, refer to the following section "Specific Project Description."

The project was designed based on legal mandates, Department planning processes, standard wildlife management practices and theories, and field data collected annually. The following sections describe these aspects of the project design.

SPECIFIC PROJECT DESCRIPTION

Deer hunting is proposed in the following general hunt zone, area-specific archery hunt, additional hunt, and fund-raising tag areas. In addition, information about the general characteristics of the project area is provided in the deer herd management plans. These plans are available for review at Department offices during normal business hours Monday through Friday at the following locations:

Department of Fish and Game 601 Locust Street Redding, CA 96001 (530) 225-2300	Department of Fish and Game 1701 Nimbus Road, Suite A Rancho Cordova, CA 95670 (916) 358-2900
Department of Fish and Game 7329 Silverado Trail Napa, CA 94558 (707) 944-5500	Department of Fish and Game 1234 East Shaw Avenue Fresno, CA 93710 (559) 243-4005, extension 151
Department of Fish and Game 4949 View Ridge Avenue San Diego, CA 92123 (858) 467-4201	Department of Fish and Game 4665 Lampson Avenue Los Alamitos, CA 90720 (562) 342-7100
Department of Fish and Game 619 Second Street Eureka, CA 95501 (707) 445-6493	Department of Fish and Game 20 Lower Ragsdale Drive, Suite 100 Monterey, CA 93940 (831) 649-2870
Department of Fish and Game 411 Burgess Drive Menlo Park, CA 94025 (650) 688-6340	Department of Fish and Game 407 West Line Street, Room 8 Bishop, CA 93514 (760) 872-1171

Table 1-1. Summary of Estimates for Harvest, Fall Buck and Fawn Ratios, Number of Deer and Buck Ratio Objectives Within Project 1-1

	*2003 Harvest		Objective	Fall 2003		Pop. Est.
Area	Reported	Estimated Harvest	Buck Ratio	Buck Ratio	Fawn Ratio	3-Year Average
A	3,989	9,119	30	20	38	167,570
B-1	1,266	2,713	30	30	33	59,580
B-2	1,106	2,346	30	26	36	42,853
B-3	238	522	30	29	36	10,217
B-4	204	507	30	29	36	8,473
B-5	263	556	30	33	39	11,360
B-6	468	1,050	30	26	40	18,087
C-1	151	213	20	8	47	4,747
C-2	128	201	25	15	48	3,530
C-3	217	338	25	29	57	7,650
C-4	375	545	20	26	48	19,333
D-3	676	957	25	26	47	18,837
D-4	153	237	30	26	47	4,823
D-5	1,103	1,746	18	26	47	33,953
D-6	692	1,047	30	39	43	21,520
D-7	615	964	25	19	56	15,727
D-8	262	408	25	20	40	9,440
D-9	90	138	25	26	47	3,277
D-10	31	37	25	25	29	3,593
D-11	145	224	25	26	47	4,190
D-12	70	114	20	26	47	1,447
D-13	145	213	25	13	43	5,553
D-14	86	133	20	19	59	1,933
D-15	14	22	25	26	47	1,133
D-16	98	151	20	19	57	2,213
D-17	46	68	25	26	47	1,057
D-19	38	58	20	26	47	913
X-1	295	413	20	16	54	6,950
X-2	39	41	12	20	70	810
X-3a	86	117	15	32	48	2,540
X-3b	188	258	20	37	61	4,493

Table 1-1. Summary of Estimates for Harvest, Fall Buck and Fawn Ratios, Number of Deer and Buck Ratio Objectives Within Project 1-1						
	*2003 Harvest		Objective	Fall 2003		Pop. Est.
Area	Reported	Estimated Harvest	Buck Ratio	Buck Ratio	Fawn Ratio	3-Year Average
X-4	90	114	20	27	50	2,170
X-5a	18	18	25	45	100	810
X-5b	28	31	25	14	41	1,247
X-6a	92	127	25	34	51	2,517
X-6b	81	85	25	29	47	1,630
X-7a	46	55	20	17	49	1,670
X-7b	45	53	20	20	59	757
X-8	30	45	25	27	46	1,393
X-9a	141	195	20	38	45	4,510
X-9b	29	42	20	48	38	1,787
X-9c	54	69	20	39	40	1,228
X-10	17	25	25	20	35	770
X-12	123	123	20	34	45	3,653
A-1	165	245	Refer to Zones C-1, C-2, C-3 and C-4			
A-3	26	36	Refer to Zone X-1			
A-4	5	5	Refer to Zone X-2			
A-5	4	5	Refer to Zone X-3a			
A-6	8	11	Refer to Zone X-3b			
A-7	6	8	Refer to Zone X-4			
A-8	2	2	Refer to Zone X-5a			
A-9	2	2	Refer to Zone X-5b			
A-11	34	47	Refer to Zone X-6a			
A-12	6	6	Refer to Zone X-6b			
A-13	3	4	Refer to Zone X-7a			
A-14	7	8	Refer to Zone X-7b			
A-15	3	5	Refer to Zone X-8			
A-16	26	36	Refer to Zone X-9a			
A-17	1	1	Refer to Zone X-9b			
A-18	2	3	Refer to Zone X-9c			
A-19	0	0	Refer to Zone X-10			
A-20	31	31	Refer to Zone X-12			

Table 1-1. Summary of Estimates for Harvest, Fall Buck and Fawn Ratios, Number of Deer and Buck Ratio Objectives Within Project 1-1						
	*2003 Harvest		Objective	Fall 2003		Pop. Est.
Area	Reported	Estimated Harvest	Buck Ratio	Buck Ratio	Fawn Ratio	3-Year Average
A-21	2	3	Refer to Zone D-6			
A-22	14	22	Refer to Zone D-16			
A-24	16	36	Refer to Zone A			
A-25	5	5	Refer to Zone A			
A-26	10	14	Refer to Zone X-6a			
A-27	2	2	Refer to Zone X-2			
A-30	5	11	Refer to Zone B-1			
A-31	26	40	Refer to Zone D-11			
A-32	2	5	Refer to Zone A			
G-1	309	449	Refer to Zone C-4			
G-3	16	16	Refer to Zone X-9b			
G-6	22	22	Refer to Zone D-8			
G-7	8	8	Refer to Zone D-3			
G-8	39	39	Refer to Zone A			
G-9	11	11	Refer to Zone A			
G-10	36	36	Refer to Zone D-15			
G-11	74	74	Refer to Zone A			
G-12	9	9	Refer to Zone D-3			
G-13	23	36	Refer to Zone D-16			
G-19	7	11	Refer to Zone D-4			
G-21	5	11	Refer to Zone A			
G-37	13	13	Refer to Zone D-6			
G-38	19	27	Refer to Zone X-10			
G-39	NEW	NEW	Refer to Zone X-9a			
M-3	30	32	Refer to Zone X-6b			
M-4	0	0	Refer to Zone X-5a			
M-5	2	2	Refer to Zone X-5b			
M-6	2	3	Refer to Zone D-16			
M-7	18	27	Refer to Zone D-13			
M-8	1	1	Refer to Zone X-6a			
M-9	4	4	Refer to Zone X-2			

Table 1-1. Summary of Estimates for Harvest, Fall Buck and Fawn Ratios, Number of Deer and Buck Ratio Objectives Within Project 1-1						
*2003 Harvest			Objective	Fall 2003		Pop. Est.
Area	Reported	Estimated Harvest	Buck Ratio	Buck Ratio	Fawn Ratio	3-Year Average
M-11	11	11	Refer to Zone B-1			
MA-1	7	16	Refer to Zone A			
MA-3	9	21	Refer to Zone A			
J-1	15	15	Refer to Zone A			
J-3	6	6	Refer to Zone C-4			
J-4	10	10	Refer to Zone B-2			
J-7	3	3	Refer to Zone X-8			
J-8	5	5	Refer to Zone D-3			
J-9	0	0	Refer to Zone D-3			
J-10	20	20	Refer to Zone A			
J-11	4	4	Refer to Zone D-14			
J-12	5	5	Refer to Zone X-9a			
J-13	2	2	Refer to Zone D-11			
J-14	8	8	Refer to Zone D-19			
J-15	3	3	Refer to Zone D-6			
J-16	15	15	Refer to Zone D-3			
J-17	3	3	Refer to Zone D-4			
J-18	14	14	Refer to Zone D-5			
J-19	16	16	Refer to Zone X-7a			
J-20	11	11	Refer to Zone X-7b			
J-21	NEW	NEW	Refer to Zone C-4			
* FRO	2	2	Valid in Any Zone or Hunt			
* FRG	3	3	Valid Statewide			
* AO	206	393	Valid in Zones A, B-1 through B-6, D-3 through D-19 and Hunt G-10			

* *Reported and Estimated harvest based on deer tags returned as of 01/12/2004. Reported and Estimated harvest does not include PLM harvest. Harvest with Fundraising Auction tags (Open Zone, FRO; Golden Opportunity, FRG) and Archery Only tags (AO) are reported separate. Harvest with FRO, FRG and AO tags is included within zone specific harvest in Figure 4.1 and Chapter 5 population analysis.*

ZONES A, B, C, D, AND X

Specific information regarding vegetation, climate, topography, and soils within the project areas can be found in the respective deer herd management plans. Copies of these plans are available for review at the Department offices listed previously in this section. In addition, main public libraries within the project area have been provided with deer herd management plans for herds within the county the library occurs. The locations of these libraries can be found in Appendix 8. Maps of all project areas are presented in Appendix 6. General methods (Section 353, Title 14, CCR) and archery equipment and crossbows (Section 354, Title 14, CCR) are valid for these zones. The bag and possession limit is: one buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

1. Zone A

   General Season: The season in Zone A-South Unit 110 and Zone A-North Unit 160 shall open on the second Saturday in August and extend for 44 consecutive days.

   Archery Season: The archery deer season in Zone A-South Unit 110 and Zone A-North Unit 160 shall open on the second Saturday in July and extend for 23 consecutive days.

   Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

   Number of Tags: 30,000-65,000. Zone A tags are valid in Zone A-South Unit 110 and Zone A-North Unit 160.

   Herd Statistics:
   a. 2003 fall buck ratio: 21
   b. Estimated 2004 spring fawn ratio: 38
   c. Estimated 2004 preseason population size 145,520
   d. Estimated 2004 hunter harvest: 11,168

   The legal boundary description of the project area is as follows:

   Shall include all of Zone A-South Unit 110 and Zone A-North Unit 160 (see subsections 360(a)(1)(A)1. through 2.).

   1. South Unit 110. In those portions of Alameda, Contra Costa, Fresno, Kern, Kings, Los Angeles, Monterey, San Benito, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Stanislaus and Ventura counties within a line beginning at the intersection of Highway 99 and the San Joaquin-Sacramento county line at Dry Creek; south on Highway 99 to Highway 166 in Kern County; west on Highway 166 to Highway 33; south on Highway 33 to Sespe Creek; east and south along Sespe Creek to Highway 126; east on Highway 126 to Interstate 5; south on

Interstate 5 and 405 to Interstate 10; west on Interstate 10 to the Pacific Ocean; north on the Pacific Ocean coastline to the San Mateo-San Francisco county line; east on the San Mateo-San Francisco county line to the Alameda county line; north on the Alameda-San Francisco county line to the Contra Costa-San Francisco county line: northwest on Contra Costa-San Francisco county line to the Contra Costa-Marin county line; northeast on the Contra Costa-Marin county line to the Contra Costa-Solano county line in San Pablo Bay; east on the Contra Costa-Solano county line and the Sacramento River to the confluence of the San Joaquin River and Sacramento-Contra Costa county line; east on the Sacramento-Contra Costa county line and San Joaquin River to the confluence of the Mokelumne River and San Joaquin-Sacramento county line; northeast on the San Joaquin-Sacramento county line and Mokelumne River to the confluence of Dry Creek; east on the San Joaquin-Sacramento county line and Dry Creek to the point of beginning at Highway 99.

2. North Unit 160. In those portions of Colusa, Glenn, Lake, Marin, Mendocino, Napa, Sacramento, Solano, Sonoma and Yolo within a line beginning at the junction of the mouth of Hardy Creek (Mendocino County) and the Pacific Ocean; east along Hardy Creek to Highway 1; north along Highway 1 to Highway 101; south along Highway 101 to Commercial Avenue in the town of Willits; east on Commercial Avenue to the Hearst-Willits Road (County Road 306); north and east on the Hearst-Willits Road to the Main Eel River; southeast on the Main Eel River to Lake Pillsbury at Scott Dam; southeast along the west shore of Lake Pillsbury and the Rice Fork of the Eel River to Forest Service Road M-10; east on Forest Service Road M-10 to Forest Service Road 17N16; east on Forest Service Road 17N16 to Forest Service Road M-10; east on Forest Service Road M-10 to Letts Valley-Fouts Spring Road; east on the Letts Valley-Fouts Spring Road to the Elk Creek-Stonyford Road (County Road 306); north on the Elk Creek-Stonyford Road to the Glenn-Colusa county line; east along the Glenn-Colusa County line to Interstate 5; Interstate 5 south to Highway 99 in the City of Sacramento; Highway 99 south to the Sacramento/San Joaquin County line at Dry Creek, west along the Sacramento/San Joaquin County line and Dry Creek to the confluence with the Mokelumne River, southwest on the Sacramento/San Joaquin County line and Mokelumne River to the confluence with the San Joaquin River and Sacramento/Contra Costa County line, west on the Sacramento/Contra Costa County line and San Joaquin River to the confluence of the Sacramento River and Solano/Contra Costa County line, west on the Sacramento River and Solano/Contra Costa County line to the Marin County line in San Pablo Bay, southwest on the Marin/Contra Costa and Marin/San Francisco county lines to the North Peninsula shoreline near the Golden Gate Bridge, west on the shoreline to the Pacific Ocean coastline, northwest on the Pacific Ocean coastline to the point of beginning.

Deer Herds: Adelaida, Avenal, Clear Lake, Mendocino, Monticello, Mount Diablo, Mount Hamilton, Pacheco-Merced, Pacheco-Stanislaus, Pozo, San Benito, Santa Barbara, Santa Cruz, Santa Lucia, Santa Rosa, Shandon

2. B Zones (includes zones B-1, B-2, B-3, B-4, B-5, and B-6)

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 35,000-65,000

A. Zone B-1

General Season: The season shall open on the third Saturday in September and extend for 37 consecutive days.

Archery Season: The season shall open on the third Saturday in August and extend for 23 consecutive days.

Herd Statistics:
a. 2003 fall buck ratio: 30
b. Estimated 2004 spring fawn ratio: 33
c. Estimated 2004 preseason population size: 57,960
d. Estimated 2004 hunter harvest: 3,375

The legal boundary description of the project area is as follows:

In the County of Del Norte and those portions of Glenn, Humboldt, Lake, Mendocino, Siskiyou and Trinity counties within a line: Beginning at the California-Oregon state line and the Pacific Ocean; east along the state line to the point where Cook-Green Pass Road (Forest Service Road 48N20) intersects the California-Oregon state line; south on the Cook-Green Pass Road to Highway 96 near Seiad Valley; west and south along Highway 96 to Highway 299 at Willow Creek; southeast along Highway 299 to the South Fork of the Trinity River; southeast along the South Fork of the Trinity River to the boundary of the Yolla Bolly-Middle Eel Wilderness Area; southwest along the boundary of the Yolla Bolly-Middle Eel Wilderness Area to the Four Corners Rock-Washington Rock Trail; south and east on the Four Corners Rock-Washington Rock Trail to the North Fork of Middle Fork Eel River; south on the North Fork of Middle Fork Eel River to Middle Fork Eel River; east on Middle Fork Eel River to confluence with Balm of Gilead Creek; north and east on Balm of Gilead Creek to confluence with Minnie Creek; east and south on Minnie Creek to Soldier Ridge Trail; north on Soldier Ridge Trail to Summit Trail; south on Summit Trail to Green Springs Trail head at Pacific Crest Road (U.S. Forest Service Road M-2); south on the Mendocino Pass Road to the intersection of Forest Highway 7; west on Forest Highway 7 to the Middle Fork of the Eel River near Eel River Work Center; southwest on the Middle Fork of the Eel River to the Black Butte River; southeast along the Black Butte River to the Glenn-Mendocino County line; south along the Glenn-Mendocino and Lake-Mendocino county lines to the northern boundary of State Game Refuge 2-A; east and south along the

northern and eastern boundaries of State Game Refuge 2-A to the Glenn-Lake County line near Sheetiron Mountain; south along the Glenn-Lake and Colusa-Lake county lines to Forest Service Road 17N16; west on Forest Service Road 17N16 to Forest Service Road M-10; west on Forest Service Road M-10 to the Rice Fork of the Eel River; northwest along the Rice Fork of the Eel River and the shore of Lake Pillsbury to the Main Eel River at Scott Dam; west and north along the Main Eel River to the Hearst-Willits Road; southwest on the Hearst-Willits Road to Commercial Avenue; west on Commercial Avenue to Highway 101; north on Highway 101 to Highway 1 at Leggett; west on Highway 1 to its intersection with the South Fork of the Eel River; north and west along the South Fork of the Eel River to the main Eel River; west and north along the main Eel River to mouth of the Eel River and north along the Pacific coastline to the point of beginning.

Deer Herds: Clear Lake, Mad River, Mendocino, Redwood Creek, Ruth, Smith River

B. Zone B-2

General Season: The season shall open on the third Saturday in September and extend for 37 consecutive days.

Archery Season: The season shall open on the third Saturday in August and extend for 23 consecutive days.

Herd Statistics:
a. 2004 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 36
c. Estimated 2004 preseason population size: 40,580
d. Estimated 2004 hunter harvest: 2,832

The legal boundary description of the project area is as follows:

In those portions of Humboldt, Shasta, Siskiyou, Tehama, and Trinity counties within a line beginning at the intersection of Interstate 5 and Highway 299 in Redding; west on Highway 299 to the Bully Choop Mountain Road at the Shasta-Trinity County line and Buckhorn Summit; south on the Bully Choop Mountain Road to a point where this road leaves the Shasta-Trinity County line at Mud Springs; southwest along the Shasta-Trinity County line to the Browns Creek-Harrison Gulch Road; south on the Browns Creek-Harrison Gulch Road to Highway 36; east on Highway 36 (200 yards) to Forest Service Arterial Road 41; south on Forest Service Arterial Road 41 to Stuart Gap at the Tehama-Trinity County line; south on the Tehama-Trinity County line to the north boundary of the Yolla Bolly-Middle Eel Wilderness Area; west and south on the Yolla Bolly-Middle Eel Wilderness boundary to the South Fork of the Trinity River; north and west along the South Fork of the Trinity River to Highway 299; west and north on Highway 299 to

Highway 96 at Willow Creek; north on Highway 96 to the Cecilville-Salmon River Road (Forest Service Road 93) at Somes Bar; east along the Cecilville-Salmon River Road to Highway 3 at Callahan; east along Highway 3 to the Gazelle-Callahan Road (Forest Service Road 1219); east along the Gazelle-Callahan Road to Highway 99; north along Highway 99 to Louie Road; east along Louie Road to Interstate 5; south along Interstate 5 to the point of beginning.

Deer Herds: Happy Camp, Hayfork, Klamath, Redwood Creek, Weaverville

C. Zone B-3

General Season: The season shall open on the third Saturday in September and extend for 37 consecutive days.

Archery Season: The season shall open on the third Saturday in August and extend for 23 consecutive days.

Herd Statistics:
a. 2003 fall buck ratio: 29
b. Estimated 2004 spring fawn ratio: 36
c. Estimated 2004 preseason population size: 9,850
d. Estimated 2004 hunter harvest: 647

The legal boundary description of the project area is as follows:

In those portions of Colusa, Glenn, Lake, Mendocino, and Tehama counties within a line beginning at the intersection of Interstate 5 and Black Butte Reservoir Road; south on Interstate 5 to the Glenn-Colusa County line; west along the Glenn-Colusa County line to the Elk Creek-Stonyford Road (County Road 306); south on the Elk Creek-Stonyford Road to the Letts Valley-Fouts Spring Road; west on the Letts Valley-Fouts Spring Road through Fouts Spring to Forest Service Road M-10; west on Forest Service Road M-10 to the Colusa-Lake County line; north along the Colusa-Lake and Glenn-Lake county lines to the eastern boundary of State Game Refuge 2-A, near Sheetiron Mountain; north and west along the eastern and northern boundaries of State Game Refuge 2-A to the Lake-Mendocino County line; north on the Lake-Mendocino and Glenn-Mendocino County lines to the Black Butte River; northwest along the Black Butte River to the Middle Fork of the Eel River; east and north along the Middle Fork of the Eel River to Forest Highway 7 near the Eel River Work Center; east on Forest Highway 7 to the Low Gap-Government Flat Road; north on the Low Gap-Government Flat Road to the Round Valley-Paskenta Road at Government Flat; east on the Round Valley-Paskenta Road to the Black Butte Lake-Newville Road; south and east on the Black Butte Lake-Newville Road to Interstate 5 at the point of beginning.

Deer Herds: Alder Springs, Capay/East Park, Clear Lake, Mendocino, Yolla Bolly

The legal boundary description of the project area is as follows:

In those portions of Butte, Glenn, Lassen, Plumas, Shasta, and Tehama counties within a line beginning at the junction of Interstate 5 and Cottonwood Creek at Cottonwood; east on Cottonwood Creek to the Sacramento River; south on the Sacramento River to Battle Creek; east on Battle Creek to the North Fork of Battle Creek; northeast on the North Fork of Battle Creek to Highway 44; east on Highway 44 to Highway 89 at the north entrance of Lassen Volcanic National Park; north and east on Highway 89 and 44 to the junction of Highway 44 at Old Station; south and east on Highway 44 to Highway 36 west of Susanville; west on Highway 36 to Highway 147 near Westwood; south on Highway 147 to Highway 89; south on

Highway 89 to Highway 70; southwest on Highway 70 to Highway 162 at Oroville; west on Highway 162 to Interstate 5; north on Interstate 5 to Cottonwood Creek to the point of beginning.

Deer Herds: East Tehama, Mother Lode

4. D-3-5 Zone

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 30,000-40,000

General Season: The season in Zones D-3, D-4, and D-5 shall open on the fourth Saturday in September and extend for 37 consecutive days.

Archery Season: The archery season shall open on the third Saturday in August and extend for 23 consecutive days.

The legal boundary description of the project area is as follows:

Shall include all of zones D-3, D-4, and D-5.

A. Zone D-3

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 14,830
d. Estimated 2004 hunter harvest: 1,165

The legal boundary description of the project area is as follows:

In those portions of Butte, Colusa, Glenn, Nevada, Placer, Plumas, Sierra, Sutter, and Yuba counties within a line beginning at the junction of Interstate 5 and Highway 162 at Willows; east on Highway 162 to Highway 70 at Oroville; northeast on Highway 70 to Highway 89; south on Highway 89 to the new Gold Lake Road (near Graeagle); south on the new Gold Lake Road to Highway 49 at Bassetts; east on Highway 49 to Yuba Pass; south on the Yuba Pass-Webber Lake Road (main haul road) through Bonta Saddle to the Jackson Meadows Highway (Fiberboard Road); west on the Jackson Meadows Highway for two miles to the White Rock Lake Road; south on the White Rock Lake Road to the new road to White Rock Lake (below Bear Valley); south and east on the new White Rock Lake Road to the Pacific Crest Trail (one mile west of White Rock Lake in Section 21, T18N, R14E, M.D.B.M.); south and east on the Pacific Crest Trail to Interstate 80 near the Castle Peak-Boreal Ridge Summit; west on Interstate 80 to Highway 20; west on Highway 20 to the Bear River in Bear Valley; west along the Bear River to Highway 65 near Wheatland; north on Highway 65 to Highway 70; north on Highway 70 to Highway 20 in Marysville; west on Highway 20 to Interstate 5 at Williams; north on Interstate 5 to the point of beginning.

Deer Herds: Blue Canyon, Bucks Mountain/Mooretown, Downieville/Nevada City, Mother Lode

B. Zone D-4

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 3,670
d. Estimated 2004 hunter harvest: 297

The legal boundary description of the project area is as follows:

In those portions of Colusa, Nevada, Placer, Sacramento, Sutter, Yolo and Yuba counties within a line beginning at the junction of Interstate 5 and Highway 20 at Williams; east on Highway 20 to Highway 70 in Marysville; south on Highway 70 to Highway 65; south on Highway 65 to the Bear River (south of Wheatland); east along the Bear River to Highway 20; east on Highway 20 to Interstate 80; east on Interstate 80 to the Pacific Crest Trail near the Castle Peak-Boreal Ridge Summit; south on the Pacific Crest Trail to Forest Route 03 at Barker Pass; east and north along Forest Route 03 to Blackwood Canyon Road; east along Blackwood Canyon Road to Highway 89 at Lake Tahoe near Idlewild; south on Highway 89 to Blackwood Creek; east on Blackwood Creek to the Lake Tahoe shoreline; south along the shore of Lake Tahoe to the mouth of Miller Creek and the common boundary between the Eldorado and Tahoe National Forests; west along Miller Creek to the Rubicon River; west along the Rubicon River through Hell Hole Reservoir to the Middle Fork of the American River; west along the Middle Fork of the American River to the American River; west along the American River to Interstate 5; north on Interstate 5 to the point of beginning.

Deer Herds: Blue Canyon, Mother Lode, Nevada City

C. Zone D-5

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 26,990
d. Estimated 2004 hunter harvest: 2,102

The legal boundary description of the project area is as follows:

In the counties of Amador and Calaveras and those portions of Alpine, El Dorado, Placer, Sacramento, San Joaquin, Stanislaus and Tuolumne counties within a line beginning at the junction of Interstate 5 and the American River in Sacramento; east along the American River to the Middle Fork of the American River; northeast along the Middle Fork of the American River to the Rubicon River; east along the Rubicon River through Hell Hole Reservoir to its confluence with Miller Creek; east along Miller Creek to its junction with the new (marked) USFS Pacific Crest Trail; north on the Pacific Crest Trail one-quarter mile to a junction with the McKinney-Rubicon Springs Road (Miller Lake Road); east along the McKinney-Rubicon Springs Road to McKinney Creek (NE 1/4, section 23, T14N, R16E, M.D.B.M.); east along McKinney Creek to the west shoreline of Lake Tahoe near Chambers Lodge; south along the shore of Lake Tahoe to the California-Nevada state line; southeast along the California-Nevada state line to Highway 50; southwest on Highway 50 to the Pacific Crest Trail at Echo Summit; south along the Pacific Crest Trail to the township line between Townships 7 and 8 North near Wolf Creek Pass; due west on that township line to the road connecting Lower and Upper Highland Lakes at Lower Highland Lake; west along that road to Highland Creek; southwest along Highland Creek to the North Fork of the Stanislaus River; west along the North Fork of the Stanislaus River to the Stanislaus River; west along the Stanislaus River to Highway 99; north along Highway 99 to Interstate 80; west on Interstate 80 to Interstate 5; north on Interstate 5 to the point of beginning.

Deer Herds: Carson River, Grizzly Flat, Mother Lode, Pacific, Railroad Flat, Salt Springs

5. Zone D-6

General Season: The season in Zone D-6 shall open on the third Saturday in September and extend for 44 consecutive days.

Archery Season: The archery season shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 6,000-16,000

Herd Statistics:
a. 2003 fall buck ratio: 39
b. Estimated 2004 spring fawn ratio: 43
c. Estimated 2004 preseason population size: 21,820
d. Estimated 2004 hunter harvest: 1,284

The legal boundary description of the project area is as follows:

In those portions of Alpine, Madera, Mariposa, Merced, Stanislaus and Tuolumne counties within a line beginning at the intersection of Highway 99 and the Stanislaus River at Ripon; east along the Stanislaus River and following the North Fork of the Stanislaus River to Highland Creek; east up Highland Creek to the road connecting Lower and Upper Highland Lakes at Upper Highland Lake; east along that road to the township line between Townships 7 and 8 North; east on that township line to the Sierra crest near Wolf Creek Pass; south along the Sierra crest to the Yosemite National Park boundary near Rodger Peak; along the eastern Yosemite National Park boundary to Highway 41; south along Highway 41 to the Madera-Mariposa County line south of Westfall Station; along the Madera-Mariposa and the Madera-Merced county lines to Highway 99; north along Highway 99 to the point of beginning.
Deer Herds: Mother Lode, Stanislaus, Tuolumne, Yosemite

6. Zone D-7

General Season: The season in Zone D-7 shall open on the third Saturday in September and extend for 44 consecutive days.

Archery Season: The archery season shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 4,000-10,000

Herd Statistics:
a. 2003 fall buck ratio: 19
b. Estimated 2004 spring fawn ratio: 56
c. Estimated 2004 preseason population size: 12,100
d. Estimated 2004 hunter harvest: 1,189

The legal boundary description of the project area is as follows:

In those portions of Fresno, Madera, Mariposa and Tulare counties within a line beginning at the intersection of Highway 99 and the Madera-Merced County line; northeast along the Madera-Merced and Madera-Mariposa county lines to Highway 41 south of Westfall Station; north along Highway 41 to Yosemite National Park boundary; east along the park boundary to the Mono-Madera County line near Rodger Peak; south along the Inyo National Forest boundary (crest of the Ritter Range) to the junction of the Inyo National Forest boundary and Ashley Creek; east to Ashley Lake; northeast along Ashley Creek to the junction of King Creek; southeast along King Creek to its junction with the middle fork of the San Joaquin River; south and west along the middle fork of the San Joaquin River to the junction of the Inyo National Forest boundary; east along Fish Creek to its confluence with Deer Creek; north and east along Deer Creek to the upper crossing of the Deer Creek trail; north and east along the Deer Creek trail to the Inyo National Forest Boundary (the Sierra Crest); south along the Sierra crest and the Inyo National Forest boundary to Bishop Pass; west along the Dusy Basin Trail to the Middle Fork of the Kings River; southwest and downstream along the Middle Fork of the Kings River to the junction of the Middle Fork and South Fork of the Kings River; southwest along the Kings River through Pine Flat Reservoir, Piedra and Reedley to Highway 99; north along Highway 99 to the point of beginning.

Deer Herds: Huntington, North Kings, Oakhurst, San Joaquin, South Sierra Foothill

7. Zone D-8

General Season: The season in Zone D-8 shall open on the fourth Saturday in September and extend for 30 consecutive days.

Archery Season: The archery season shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5,000-10,000

Herd Statistics:
a. 2003 fall buck ratio: 20
b. Estimated 2004 spring fawn ratio: 40
c. Estimated 2004 preseason population size: 6,550
d. Estimated 2004 hunter harvest: 510

The legal boundary description of the project area is as follows:

In those portions of Fresno, Kern and Tulare counties within a line beginning at the intersection of Highway 99 and the Kings River; upstream and northeast along the

Kings River through Reedley, Piedra and Pine Flat Reservoir to the junction of the Middle and South Forks of the Kings River; northeast along the Middle Fork Kings River to the Dusy Basin Trail; east along this trail to the Kings Canyon National Park boundary at Bishop Pass; south along the Kings Canyon and Sequoia National Park boundaries to the Main Kern River; southeast along the Main Kern River and the common boundary between the Inyo and Sequoia National Forests to the end of the Chimney Meadow-Blackrock Station Road (Forest Road 21S03) near Blackrock Mountain; southeast along the Chimney Meadow-Blackrock Station Road through Troy Meadows to the South Fork of the Kern River; south along the South Fork of the Kern River to the Doyle Ranch Road; south along the Doyle Ranch Road to Highway 178 in the town of Onyx; southwest along Highway 178 to Highway 99 at Bakersfield; north along Highway 99 to the point of beginning.

Deer Herds: Greenhorn, Hume, Kaweah, Kern River, South Sierra Foothill and Tule River.

8. Zone D-9

General Season: The season in Zone D-9 shall open on the fourth Saturday in September and extend for 30 consecutive days.

Archery Season: The archery season shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 1,000-2,500

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 2,070
d. Estimated 2004 hunter harvest: 167

The legal boundary description of the project area is as follows:

In that portion of Kern County within a line beginning at the intersection of Highways 99 and 178; northeast along Highway 178 along Lake Isabella and through Walker Pass to Highway 14; southwest along Highway 14 to Highway 58; northwest along Highway 58 to Highway 99; north along Highway 99 to the point of beginning.

Deer Herd: Piute Deer Herd

9. Zone D-10

General Season: The season in Zone D-10 shall open on the fourth Saturday in September and extend for 30 consecutive days.

Archery Season: The archery season shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 400-800

Herd Statistics:
a. 2003 fall buck ratio: 25
b. Estimated 2004 spring fawn ratio: 29
c. Estimated 2004 preseason population size: 2,380
d. Estimated 2004 hunter harvest: 214

The legal boundary description of the project area is as follows:

In those portions of Kern and Los Angeles counties within a line beginning at the intersection of Highways 99 and 58; southeast along Highway 58 to Highway 14; south along Highway 14 to Highway 138; west along Highway 138 to Interstate 5; north on Interstate 5 to Highway 99; north on Highway 99 to the point of beginning.

Deer Herd: Tejon

10. Zone D-11

General Season: The season in Zone D-11 shall open on the second Saturday in October and extend for 30 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 2,500-6,000

Special Conditions: Hunters that possess a D-11 deer tag may also hunt in zones D-13 and D-15 as described in subsections 360(a)(12)(A)(B)(C) and 360(a)(14)(A)(B)(C), respectively.

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 3,440
d. Estimated 2004 hunter harvest: 298

The legal boundary description of the project area is as follows:

Those portions of Los Angeles and San Bernardino counties, within a line beginning at the intersection of Interstate 5 and Highway 138, south of Gorman; east on Highway 138 to Highway 14; south on Highway 14 to Palmdale and Highway 138; east on Highways 138 and 18 to Interstate 15; south on interstates 15 and 15E to Interstate 10; west on Interstate 10 to Interstate 405; north on Interstates 405 and 5 to the point of beginning.

Deer Herd: Los Angeles

11. Zone D-12

General Season: The season in Zone D-12 shall open on the first Saturday in November and extend for 23 consecutive days.

Archery Season: The archery season shall open on the first Saturday in October and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,500

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 1,680
d. Estimated 2004 hunter harvest: 135

The legal boundary description of the project area is as follows:

Those portions of Imperial, Riverside and San Bernardino counties within a line beginning at Highway 62 and the Twentynine Palms-Amboy Road in Twentynine Palms; east along Highway 62 to Highway 95 at Vidal Junction; north on Highway 95 to Interstate 40; east on Interstate 40 to the California-Arizona state line; south along this state line to the U.S.-Mexican border; west along the U.S.-Mexican border to Highway 111 in Calexico; north on Highway 111 to Interstate 10; north and west on Interstate 10 to Highway 62; north and east on Highway 62 to the point of beginning.

Deer Herd: Burro

12. Zone D-13

General Season: The season in Zone D-13 shall open on the second Saturday in October and extend for 30 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 2,000-5,000

Special Conditions: Hunters that possess a D-13 deer tag may also hunt in zones D-11 and D-15 as described in subsections 360(a)(10)(A)(B)(C) and 360(a)(14)(A)(B)(C), respectively.

Herd Statistics:
a. 2003 fall buck ratio: 13
b. Estimated 2004 spring fawn ratio: 43
c. Estimated 2004 preseason population size: 2,700
d. Estimated 2004 hunter harvest: 257

The legal boundary description of the project area is as follows:

In those portions of Kern, Los Angeles, San Luis Obispo, Santa Barbara, and Ventura counties within a line beginning at the intersection of Highways 99 and 166 at Mettler; south on Highway 99 and Interstate 5 to Highway 126; west on Highway 126 to the crossing of Sespe Creek; north and then west along Sespe Creek to Highway 33; north on Highway 33 to Highway 166; north and east on Highway 166 to the point of beginning.

Deer Herds: Mount Pinos, Santa Barbara/Ventura

13. Zone D-14

General Season: The season in Zone D-14 shall open on the second Saturday in October and extend for 30 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 2,000-3,500

Herd Statistics:
a. 2003 fall buck ratio: 19
b. Estimated 2004 spring fawn ratio: 59
c. Estimated 2004 preseason population size: 1,610
d. Estimated 2004 hunter harvest: 159

The legal boundary description of the project area is as follows:

In those portions of Riverside and San Bernardino counties within a line beginning at the junction of Interstates 10 and 15E; northwest on Interstates 15E and 15 through Cajon Pass to Bear Valley Cutoff Road; east on Bear Valley Cutoff Road to Highway 18; east along Highway 18 to Highway 247; southeast on Highway 247 to Highway 62; southwest on Highway 62 to Interstate 10; west on Interstate 10 to the point of beginning.

Deer Herd: San Bernardino Mountains

14. Zone D-15

General Season: The season in Zone D-15 shall open on the second Saturday in October and extend for 30 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 500-2,000

Special Conditions: Hunters that possess a D-15 deer tag may also hunt in zones D-11 and D-13 as described in subsections 360(a)(10)(A)(B)(C) and 360(a)(12)(A)(B)(C), respectively.

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 1,600
d. Estimated 2004 hunter harvest: 269

The legal boundary description of the project area is as follows:

Including Santa Catalina Island, those portions of Los Angeles, Orange, Riverside, San Bernardino and San Diego counties within a line beginning at the Pacific Ocean and Interstate 10 in Santa Monica; east on Interstate 10 to Highway 79 at Beaumont; south on Highway 79 to Hemet; south on County Road R-3 through Sage to Highway 79; west on Highway 79 to Interstate 15; south on Interstate 15 to Highway 76; west on Highway 76 to the Pacific Ocean; north along the shoreline to the point of beginning.

Deer Herd: Santa Ana Mountains

15. Zone D-16

General Season: The season in Zone D-16 shall open on the fourth Saturday in October and extend for 30 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 1,000-3,500

Herd Statistics:
a. 2003 fall buck ratio: 19
b. Estimated 2004 spring fawn ratio: 57
c. Estimated 2004 preseason population size: 1,760
d. Estimated 2004 hunter harvest: 182

The legal boundary description of the project area is as follows:

Those portions of Riverside, Imperial and San Diego counties within the line beginning at the Pacific Ocean and Highway 76; east on Highway 76 to Interstate 15; north on Interstate 15 to Highway 79; east on Highway 79 to the San Diego-Riverside County line; east along the San Diego-Riverside County line to the Anza-Borrego State Park boundary; south along the Anza-Borrego State Park boundary to Highway 78; east on Highway 78 to Highway 111; south on Highway 111 to the U.S.-Mexican border; west along the U.S.-Mexican border to the Pacific Ocean; north along the shoreline to the point of beginning.

Deer Herds: San Diego, San Jacinto/Santa Rosa Mountains

16. Zone D-17

General Season: The season in Zone D-17 shall open on the second Saturday in October and extend for 23 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-800

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 1,000
d. Estimated 2004 hunter harvest: 81

The legal boundary description of the project area is as follows:

Those portions of Inyo, Kern, Los Angeles and San Bernardino counties within a line beginning at Highway 395 and the Kern-Inyo County line; east along the Kern-Inyo County line to the San Bernardino-Inyo County line; east along the San Bernardino-Inyo County line to Highway 127; north along Highway 127 to the California-Nevada state line; south along the California-Nevada state line to the California-Arizona state line; south along the California-Arizona state line to Interstate 40; Interstate 40 north to Needles; Highway 95 south to Highway 62; west on Highway 62 to Highway 247; northwest on Highway 247 to Highway 18; west on Highway 18 to Bear Valley Cutoff Road; west on Bear Valley Cutoff Road to Interstate 15; north on Interstate 15 to Highway 18; west on Highways 18 and 138 to Highway 14; north on Highways 14 and 395 to the point of beginning.

Deer Herd: Eastern Mojave Desert

17. Zone D-19

General Season: The season in Zone D-19 shall open on the first Saturday in October and extend for 30 consecutive days.

Archery Season: The archery season shall open on the first Saturday in September and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 500-2,000

Herd Statistics:
a. 2003 fall buck ratio: 26
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 950
d. Estimated 2004 hunter harvest: 70

The legal boundary description of the project area is as follows:

Those portions of Imperial, Riverside and San Diego counties within a line beginning at the junction of Interstate 10 and Highway 79; south on Highway 79 to Hemet; south on County Road R-3 to Highway 79; south on Highway 79 to the Riverside-San Diego County line; east on the Riverside-San Diego County line to the Anza-Borrego State Park boundary; south on the Anza-Borrego State Park boundary to Highway 78; east on Highway 78 to Highway 111; north on Highway 111 to the junction of Interstate 10 in Indio; west on Interstate 10 to the point of beginning.

Deer Herd: San Jacinto/Santa Rosa Mountains

18. Zone X-1

General Season: The season in Zone X-1 shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 1,000-6,000

Herd Statistics:
a. 2003 fall buck ratio: 16
b. Estimated 2004 spring fawn ratio: 54
c. Estimated 2004 preseason population size: 5,230
d. Estimated 2004 hunter harvest: 482

The legal boundary description of the project area is as follows:

In those portions of Lassen, Modoc, Shasta and Siskiyou counties within a line beginning at the California-Oregon state line and its intersection with Highway 139; south on Highway 139 to the Lookout-Hackamore Road; south on the Lookout-Hackamore Road to Highway 299; west on Highway 299 to the Pit River near Bieber; south and west on the Pit River to Highway 89 at Lake Britton; northwest on Highway 89 to Interstate 5 at Mt. Shasta; north on Interstate 5 to the junction of Highway 97 at

Weed; north and east on Highway 97 to the California-Oregon state line; east on the California-Oregon state line to the point of beginning.

Deer Herd: McCloud Flats

19. Zone X-2

General Season: The season in Zone X-2 shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-500

Herd Statistics:
a. 2003 fall buck ratio: 20
b. Estimated 2004 spring fawn ratio: 70
c. Estimated 2004 preseason population size: 600
d. Estimated 2004 hunter harvest: 55

The legal boundary description of the project area is as follows:

In those portions of Modoc and Siskiyou counties within a line beginning at the intersection of Highway 139 and the California-Oregon state line near Tulelake; east along the California-Oregon state line to the eastern shoreline of Goose Lake; southwest along the eastern shoreline of Goose Lake to Westside Road (Modoc County 48); southeast along the Westside Road to Highway 395 in Davis Creek; south along Highway 395 to Highway 299 in Alturas; west along Highway 299 to Highway 139 near Canby; northwest along Highway 139 to the Oregon-California state line and the point of beginning.

Deer Herd: Devil's Garden/Interstate

20. Zone X-3a

General Season: The season in Zone X-3a shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 150-1,500

Herd Statistics:

a. 2003 fall buck ratio: 32
b. Estimated 2004 spring fawn ratio 48
c. Estimated 2004 preseason population size: 2,130
d. Estimated 2004 hunter harvest: 146

The legal boundary description of the project area is as follows:

In those portions of Lassen and Modoc counties within a line beginning at the intersection of the Lookout-Hackamore Road and Highway 139; southeast on Highway 139 to Highway 299; east on Highway 299 to Highway 395 in Alturas; south on Highway 395 to the Termo-Grasshopper Road (Lassen County 513); west on the Termo-Grasshopper Road to Highway 139; south on Highway 139 to the Cleghorn Road (Lassen County 521); west and north on the Cleghorn Road to Lassen County Road 519 near Coulthurst Flat; west on Lassen County Road 519 to U.S. Forest Service Designated Through Route 22 near Gooch Mountain; west and north on U.S. Forest Service Designated Through Route 22 to the Little Valley Road (Lassen County 404); north on the Little Valley Road to the Western Pacific Railroad; northeast on the Western Pacific Railroad to Horse Creek; northwest on Horse Creek to the Pit River; north on the Pit River to Highway 299 at Bieber; northeast on Highway 299 to the Bieber-Lookout-Hackamore Road; north along the Bieber-Lookout-Hackamore Road to the point of beginning.

Deer Herds: Adin, West Lassen

21. Zone X-3b

General Season: The season in Zone X-3b shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 200-3,000

Herd Statistics:
a. 2003 fall buck ratio: 37
b. Estimated 2004 spring fawn ratio: 61
c. Estimated 2004 preseason population size: 4,860
d. Estimated 2004 hunter harvest: 311

The legal boundary description of the project area is as follows:

In those portions of Lassen and Modoc counties within a line beginning at the east shoreline of Goose Lake and the California-Oregon state line; east along this state line to the California-Nevada state line; south along the California-Nevada state line to the

Clarks Valley-Red Rock-Tuledad Road (Lassen County Roads 512, 510 and 506); west along the Tuledad Red Rock-Clarks Valley Road to Highway 395 at Madeline; north on Highway 395 to Westside Road (Modoc County 48) in Davis Creek; west and north along Westside Road to the south shoreline of Goose Lake; east and north along the south and east shoreline of Goose Lake to the point of beginning.

Deer Herd: Warner Mountains

22. Zone X-4

General Season: The season in Zone X-4 shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,500

Herd Statistics:
a. 2003 fall buck ratio: 27
b. Estimated 2004 spring fawn ratio: 50
c. Estimated 2004 preseason population size: 1,800
d. Estimated 2004 hunter harvest: 138

The legal boundary description of the project area is as follows:

In those portions of Lassen and Shasta counties within a line beginning at the junction of highways 89 and 44 at Old Station; north on Highway 89 to the intersection with the Pit River at Lake Britton; east and south on the Pit River to Horse Creek; southeast on Horse Creek to the Burlington Northern Railroad; southwest on the Burlington Northern Railroad to the Little Valley Road (Lassen County 404); south on the Little Valley Road to U.S. Forest Service Designated Through Route 22; south and east on U.S. Forest Service Designated Through Route 22 to Lassen County 519 near Gooch Mountain; east on Lassen County 519 to Cleghorn Road (Lassen County 521) near Coulthurst Flat; east on Cleghorn Road to Highway 139; south on Highway 139 to its crossing of Willow Creek in the Willow Creek Valley; south (downstream) on Willow Creek to its crossing of Conservation Center Road (Lassen County A-27); west on Conservation Center Road to Highway 36; northwest on Highway 36 to the intersection with Highway 44; north and west on Highway 44 to the point of beginning.

Deer Herds: Cow Creek, West Lassen, East Lassen

23. Zone X-5a

General Season: The season shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-300

Herd Statistics:
a. 2003 fall buck ratio: 45
b. Estimated 2004 spring fawn ratio: 80
c. Estimated 2004 preseason population size: 370
d. Estimated 2004 hunter harvest: 20

The legal boundary description of the project area is as follows:

In that portion of Lassen County within a line beginning at the junction of Highway 395 and Conservation Center Road (Lassen County A-27) in the town of Litchfield; west on Conservation Center Road to its crossing of Willow Creek; northwest (upstream) on Willow Creek to its crossing of Highway 139 in the Willow Creek Valley; north along Highway 139 to the Termo-Grasshopper Road; east on the Termo-Grasshopper Road to Highway 395; south along Highway 395 to the point of beginning.

Deer Herd: East Lassen

24. Zone X-5b

General Season: The season shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-800

Herd Statistics:
a. 2003 fall buck ratio: 14
b. Estimated 2004 spring fawn ratio: 41
c. Estimated 2004 preseason population size: 540
d. Estimated 2004 hunter harvest: 44

The legal boundary description of the project area is as follows:

That portion of Lassen County lying within the following line: Beginning at the junction of Highway 395 and the Clarks Valley-Red Rock-Tuledad Road (Lassen County Roads 506, 510 and 512); east on the Clarks Valley-Red Rock-Tuledad Road to the California-Nevada state line; south on the California-Nevada state line to the Pyramid Lake Road (Lassen County 320); west on the Pyramid Lake Road to Highway 395; north on Highway 395 to the point of beginning.

Deer Herd: East Lassen

25. Zone X-6a

General Season: The season in Zone X-6a shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,200

Herd Statistics:
a. 2003 fall buck ratio: 34
b. Estimated 2004 spring fawn ratio: 51
c. Estimated 2004 preseason population size: 3,190
d. Estimated 2004 hunter harvest: 196

The legal boundary description of the project area is as follows:

In those portions of Lassen and Plumas counties within a line beginning at the junction of Highway 147 and Highway 36 near Westwood; east on Highway 36 to Conservation Center Road at Susanville (County Road A-27); east on Conservation Center Road to Highway 395 at the town of Litchfield; east on Highway 395 to the Wendel-Pyramid Lake Road (County Road 320); east on the Wendel-Pyramid Lake Road to the Nevada-California state line; south on the Nevada-California state line to the UP-WP railroad line near Herlong; west on the UP-WP railroad line to the Herlong Access Road (County Road A-25) at Herlong; west on the Herlong Access Road to Highway 395; north on Highway 395 to County Road 336 at Milford; southwest on County Road 336 to U.S. Forest Service Road 26N16 near the Plumas-Lassen County line; west on Forest Service Road 26N16 to Forest Service Road 28N03 at Doyle Crossing; west on Forest Service Road 28N03 to Forest Service Road 29N43 near Antelope Lake; south on Forest Service Road 29N43 to County Road 111 at Flournoy Bridge; south on County Road 111 to Forest Service Road 24N08; south on Forest Service Road 24N08 to County Road 112 at Lake Davis; south on County Road 112 to Highway 70; west on Highway 70 to the Highway 89 junction at Blairsden; west on Highway 89/70 to the Greenville "Y" west of Quincy; northwest on Highway 89 to Highway 147 at Canyon Dam; north on Highway 147 to the point of beginning.

Deer Herds: Doyle, Sloat

26. Zone X-6b

General Season: The season in Zone X-6b shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,200

Herd Statistics:
a. 2003 fall buck ratio: 29
b. Estimated 2004 spring fawn ratio: 47
c. Estimated 2004 preseason population size: 1,910
d. Estimated 2004 hunter harvest: 120

The legal boundary description of the project area is as follows:

In those portions of Lassen and Plumas counties within a line beginning at the junction of County Road 336 and Highway 395 at Milford; south on Highway 395 to the junction of Highway 395 and the Herlong Access Road (County Road A-25); east on the Herlong Access Road to its junction with the UP-WP railroad line at Herlong; east on the UP-WP railroad line to the Nevada-California state line; south on the Nevada-California state line to the junction of the Nevada-California state line and Highway 395 at Bordertown; northwest on Highway 395 to its junction with Highway 70; west on Highway 70 to its junction with County Road 112; north on County Road 112 to its junction with U.S. Forest Service Road 24N08 at Lake Davis; north on Forest Service Road 24N08 to its junction with County Road 111; northwest on County Road 111 to its junction with Forest Service Road 29N43 at Flournoy Bridge; north on Forest Service Road 29N43 to Forest Service Road 28N03 near Antelope Lake; southeast on Forest Service Road 28N03 to Forest Service Road 26N16 at Doyle Crossing; east on Forest Service Road 26N16 to County Road 336 near the Plumas-Lassen county line; north on County Road 336 to the point of beginning.

Deer Herd: Doyle

27. Zone X-7a

General Season: The season in Zone X-7a shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-600

Herd Statistics:
a. 2003 fall buck ratio: 17
b. Estimated 2004 spring fawn ratio: 49
c. Estimated 2004 preseason population size: 910
d. Estimated 2004 hunter harvest: 66

The legal boundary description of the project area is as follows:

In those portions of Lassen, Nevada, Plumas and Sierra counties lying within a line beginning at the junction of Highway 395 and the California-Nevada state line at Bordertown; south along the Long Valley Road (County Road S570) to its intersection with the Henness Pass Road (County Road S860); west on Henness Pass Road over Summit 2 to the intersection with County Road S450 (near the Davies Creek Campground at Stampede Reservoir); west on County Road S450 (the Henness Pass Road) through Kyburz Flat to its intersection with Highway 89; south on Highway 89 to its intersection with Interstate 80 at Truckee; west on Interstate 80 to the Pacific Crest Trail near the Castle Peak-Boreal Ridge Summit; north on the Pacific Crest Trail to the new road to White Rock Lake (one mile west of White Rock Lake in Section 21, T18N, R14E, M.D.B.M.); north on the new White Rock Lake Road below Bear Valley to the White Rock Lake Road; north on the White Rock Lake Road to the Jackson Meadows Highway (Fiberboard Road); east two miles on the Jackson Meadows Highway to the Yuba Pass Road at Webber Lake; north on the Yuba Pass Road (main haul road) through Bonta Saddle to Highway 49 at Yuba Pass; west on Highway 49 to the new Gold Lake Road at Bassetts; north on the new Gold Lake Road to Highway 89 near Graeagle; north on Highway 89 to Highway 70; east on Highway 70 to Highway 395 at Hallelujah Junction; south on Highway 395 to the point of beginning.

Deer Herd: Loyalton/Truckee

28. Zone X-7b

General Season: The season in Zone X-7b shall open on the first Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-200

Herd Statistics:

a. 2003 fall buck ratio: 20
b. Estimated 2004 spring fawn ratio: 59
c. Estimated 2004 preseason population size: 810
d. Estimated 2004 hunter harvest: 58

The legal boundary description of the project area is as follows:

In those portions of Nevada, Placer and Sierra counties lying within a line beginning at the junction of Highway 395 and the California-Nevada state line at Bordertown; south along the California-Nevada state line to the shore of Lake Tahoe; west and south along the shore of Lake Tahoe to the mouth of Blackwood Creek near Idlewild; west on Blackwood Creek to Highway 89; north on Highway 89 to Blackwood Canyon Road; Blackwood Canyon Road near Idlewild; west along Blackwood Canyon Road to Forest Route 03; west and south along Forest Route 03 to the Pacific Crest Trail at Barker Pass; north on the Pacific Crest Trail to its intersection with Interstate 80 near the Castle Peak-Boreal Ridge Summit; east on Interstate 80 to its intersection with Highway 89 at Truckee; north on Highway 89 to County Road S450 (the Henness Pass Road, a.k.a. the Kyburz Flat Road); east on County Road S450 to its intersection with County Road S860 (continuation of Henness Pass Road) near the Davies Creek Campground at Stampede Reservoir; east on County Road S860, over Summit 2 to the junction with County Road S570 (the Long Valley Road); north on County Road S570 to Bordertown at the point of beginning.

Deer Herd: Loyalton/Truckee

29. Zone X-8

General Season: The season in Zone X-8 shall open on the fourth Saturday in September and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-750

Herd Statistics:
a. 2003 fall buck ratio: 27
b. Estimated 2004 spring fawn ratio: 46
c. Estimated 2004 preseason population size: 770
d. Estimated 2004 hunter harvest: 52

The legal boundary description of the project area is as follows:

In those portions of Alpine and El Dorado counties within a line beginning at the junction of the California-Nevada state line and Highway 50; southeast along the

California-Nevada state line to the Indian Springs Road, south to the Alpine-Mono County line; south along the Alpine-Mono county line to the Sierra crest; northwest along the Sierra crest to the intersection with the Pacific Crest Trail near Wolf Creek Pass; northwest along the Pacific Crest Trail to Highway 50 at Echo Summit; northeast on Highway 50 to the point of beginning.

Deer Herd: Carson River

30. Zone X-9a

General Season: The season in Zone X-9a shall open on the third Saturday in September and extend for 24 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351 (a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,200

Herd Statistics:
a. 2003 fall buck ratio: 38
b. Estimated 2004 spring fawn ratio: 45
c. Estimated 2004 preseason population size: 4,680
d. Estimated 2004 hunter harvest: 227

The legal boundary description of the project area is as follows:

In those portions of Fresno, Inyo, Madera and Mono counties within a line beginning at the intersection of Highway 6 and the California-Nevada state line; south along Highway 6 to its junction with Highway 395; south along Highway 395 to its junction with Highway 168; west and south along Highway 168 to the North Lake Road turnoff; west along the North Lake Road and the Piute Pass Trail to the Sierra Crest (Inyo National Forest Boundary); north along the Inyo National Forest Boundary to the Deer Creek Trail; south and west along the Deer Creek Trail to the upper crossing of Deer Creek; west and south along Deer Creek to its confluence with Fish Creek; west along Fish Creek to its confluence with the middle fork of the San Joaquin River; north along the middle fork of the San Joaquin River to the junction of King Creek; west along King Creek to the junction of Ashley Creek; west along Ashley Creek to Ashley Lake; continue west along Ashley Creek to the junction of the Inyo National Forest boundary; north along the Inyo National Forest Boundary (the crest of the Ritter Range) to the Mono-Tuolumne county line; north on the Mono-Tuolumne County line to the Virginia Lakes Trail (Entry Trail D-11); east along Virginia Lakes Trail to Virginia Lakes Road; east along Virginia Lakes Road to Highway 395; south along Highway 395 to Highway 167; east on Highway 167 to the California-Nevada state line; southeast on the California-Nevada state line to the point of beginning.

Deer Herds: Casa Diablo, Sherwin Grade, Buttermilk

31. Zone X-9b

General Season: The season in Zone X-9b shall open on the third Saturday in September and extend for 24 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-600

Herd Statistics:
a. 2003 fall buck ratio: 48
b. Estimated 2004 spring fawn ratio: 38
c. Estimated 2004 preseason population size: 1,600
d. Estimated 2004 hunter harvest: 50

The legal boundary description of the project area is as follows:

That portion of Inyo County within a line beginning at the intersection of Highway 395 and Cottonwood Creek; northwest along Cottonwood Creek to the Horseshoe Meadow Road; south along the Horseshoe Meadow Road to the Cottonwood Pass Trail; west along the Cottonwood Pass Trail through Horseshoe Meadow to the Inyo-Tulare County line at Cottonwood Pass; north on the Inyo-Tulare and the Inyo-Fresno county lines to the Piute Pass Trail; east along the Piute Pass Trail to the North Lake Road; east and south on the North Lake Road to Highway 168; north and east on Highway 168 to Highway 395; south on Highway 395 to the point of beginning.

Deer Herds: Goodale

32. Zone X-9c

General Season: The season in Zone X-9c shall open on the third Saturday in October and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,000

Herd Statistics:
a. 2003 fall buck ratio: 48
b. Estimated 2004 spring fawn ratio: 38
c. Estimated 2004 preseason population size: 1,600

d. Estimated 2004 hunter harvest: 50

The legal boundary description of the project area is as follows:

In those portions of Inyo and Mono counties within a line beginning at Highway 395 and the Kern-Inyo County line; north along Highway 395 to Highway 6; north on Highway 6 to the California-Nevada state line; southeast along the California-Nevada state line to Highway 127; south along Highway 127 to the Inyo-San Bernardino County line; west along the Inyo-San Bernardino County line to the Kern-Inyo County line; west along the Kern-Inyo County line to the point of beginning.

Deer Herd: Inyo/White Mountains

33. Zone X-10

General Season:
The season in Zone X-10 shall open on the last Saturday in September and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 200-600

Herd Statistics:
a. 2003 fall buck ratio: 20
b. Estimated 2004 spring fawn ratio: 35
c. Estimated 2004 preseason population size: 810
d. Estimated 2004 hunter harvest: 44

The legal boundary description of the project area is as follows:

In those portions of Kern, Tulare and Inyo counties within a line beginning at the intersection of Highway 178 and the Doyle Ranch Road in the town of Onyx; north along the Doyle Ranch Road to the South Fork of the Kern River; north along the South Fork of the Kern River to the Chimney Meadow-Blackrock Station Road (Forest Road 21S03); northwest along the Chimney Meadow-Blackrock Station Road through Troy Meadows to the road's end at the Inyo and Sequoia National Forest boundary near Blackrock Mountain; northwest along the Inyo and Sequoia National Forest boundary to the main Kern River; northwest along the main Kern River to the Sequoia National Park boundary; northeast along the Sequoia National Park boundary to the Inyo-Tulare County line; southeast along the Inyo-Tulare County line to the Cottonwood Pass Trail at Cottonwood Pass; east along the Cottonwood Pass Trail through Horseshoe Meadow to the Horseshoe Meadow Road; north along the Horseshoe Meadow Road to Cottonwood Creek; southeast along Cottonwood Creek to Highway 395; south along

Highway 395 to Highway 14; south along Highway 14 to Highway 178; north and west along Highway 178 to the point of beginning.

Deer Herd: Monache

34. Zone X-12

General Season: The season in Zone X-12 shall open on the third Saturday in September and extend for 24 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 100-1,500

Herd Statistics:
a. 2003 fall buck ratio: 34
b. Estimated 2004 spring fawn ratio: 30
c. Estimated 2004 preseason population size: 3,540
d. Estimated 2004 hunter harvest: 167

The legal boundary description of the project area is as follows:

That portion of Mono County within a line beginning at the junction of the California-Nevada state line and Highway 167 (Pole Line Road); west on Highway 167 to Highway 395; north on Highway 395 to Virginia Lakes Road; west on Virginia Lakes Road to the Virginia Lakes Trail (Entry Trail D11); northwest on the Virginia Lakes Trail to the Mono-Tuolumne County line; north along the Mono-Tuolumne County line to the Mono-Alpine County line; northeast along the Mono-Alpine County line to the Indian Springs Road; northeast on Indian Springs Road to the California-Nevada state line; southeast on the California-Nevada state line to the point of beginning.

Deer Herds: East Walker, West Walker, Mono Lake

AREA-SPECIFIC ARCHERY HUNTS

Archery Hunting With Area-specific Archery Tags. Deer may be taken only with archery equipment specified in Section 354, only during the archery seasons as follows:

35. A-1 (C Zones Archery Only Hunt)

Season:
1. Zone C-1. The archery season for Zone C-1 shall open on the third Saturday in August and extend for 16 consecutive days.

2. Zone C-2. The archery season for Zone C-2 shall open on the third Saturday in August and extend for 23 consecutive days.
3. Zone C-3. The archery season for Zone C-3 shall open on the third Saturday in August and extend for 23 consecutive days.
4. Zone C-4. The archery season for Zone C-4 shall open on the third Saturday in August and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 150-3,000. A-1 (C Zones Archery Only Hunt) tags are valid in Zones C-1, C-2, C-3, and C-4 only during the archery season as specified above in subsections 361(b)(1)(B)1 through 4.

Herd Statistics: See Zones C-1 through C-4.
Estimated 2004 hunter harvest: 213

The legal boundary description of the project area is as follows: Shall include all of Zones C-1, C-2, C-3, and C-4 as described in subsections 360(a)(3)(A)1. through 4.

Deer Herds: See Zones C-1 through C-4.

36. A-3 Hunt (Zone X-1 Archery Hunt)

Season: The archery season for hunt A-3 (Zone X-1 Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-1,000

Herd Statistics: See Zone X-1.
Estimated 2004 hunter harvest: 57

The legal boundary description of the project area is as follows: See Zone X-1.

Deer Herds: See Zone X-1.

37. A-4 Hunt (Zone X-2 Archery Hunt)

Season: The archery season for hunt A-4 (Zone X-2 Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-200

Herd Statistics: See Zone X-2.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows: See Zone X-2.

Deer Herds: See Zone X-2.

38. A-5 Hunt (Zone X-3a Archery Hunt)

Season: The archery season for hunt A-5 (Zone X-3a Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-300

Herd Statistics: See Zone X-3a.
Estimated 2004 hunter harvest: 15

The legal boundary description of the project area is as follows: See Zone X-3a.

Deer Herds: See Zone X-3a.

39. A-6 Hunt (Zone X-3b Archery Hunt)

Season: The archery season for hunt A-6 (Zone X-3b Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-400

Herd Statistics: See Zone X-3b.
Estimated 2004 hunter harvest: 23

The legal boundary description of the project area is as follows: See Zone X-3b.

Deer Herds: See Zone X-3b.

40. A-7 Hunt (Zone X-4 Archery Hunt)

Season: The archery season for hunt A-7 (Zone X-4 Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-400

Herd Statistics: See Zone X-4.
Estimated 2004 hunter harvest: 13

The legal boundary description of the project area is as follows: See Zone X-4.

Deer Herds: See Zone X-4.

41. A-8 Hunt (Zone X-5a Archery Hunt)

Season: The archery season for hunt A-8 (Zone X-5a Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 15-100

Herd Statistics: See Zone X-5a.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows: See Zone X-5a.

Deer Herds: See Zone X-5a.

42. A-9 Hunt (Zone X-5b Archery Hunt)

Season: The archery season for hunt A-9 (Zone X-5b Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-100

Herd Statistics: See Zone X-5b.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows: See Zone X-5b.

Deer Herds: See Zone X-5b.

43. A-11 Hunt (Zone X-6a Archery Hunt)

Season: The archery season for hunt A-11 (Zone X-6a Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-300

Herd Statistics: See Zone X-6a.
Estimated 2004 hunter harvest: 12

The legal boundary description of the project area is as follows: See Zone X-6a.

Deer Herds: See Zone X-6a.

44. A-12 Hunt (Zone X-6b Archery Hunt)

Season: The archery season for hunt A-12 (Zone X-6b Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-200

Herd Statistics: See Zone X-6b.
Estimated 2004 hunter harvest: 15

The legal boundary description of the project area is as follows: See Zone X-6b.

Deer Herds: See Zone X-6b.

45. A-13 Hunt (Zone X-7a Archery Hunt)

Season: The archery season for hunt A-13 (Zone X-7a Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-200

Herd Statistics: See Zone X-7a.
Estimated 2004 hunter harvest: 13

The legal boundary description of the project area is as follows: See Zone X-7a.

Deer Herds: See Zone X-7a.

46. A-14 Hunt (Zone X-7b Archery Hunt)

Season: The archery season for hunt A-14 (Zone X-7b Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-100

Herd Statistics: See Zone X-7b.
Estimated 2004 hunter harvest: 18

The legal boundary description of the project area is as follows: See Zone X-7b.

Deer Herds: See Zone X-7b.

47. A-15 Hunt (Zone X-8 Archery Hunt)

Season: The archery season for hunt A-15 (Zone X-8 Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-200

Herd Statistics: See Zone X-8.

Estimated 2004 hunter harvest: 9

The legal boundary description of the project area is as follows: See Zone X-8.

Deer Herds: See Zone X-8.

48. A-16 Hunt (Zone X-9a Archery Hunt)

Season: The archery season for hunt A-16 (Zone X-9a Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-750

Herd Statistics: See Zone X-9a.
Estimated 2004 hunter harvest: 28

The legal boundary description of the project area is as follows: See Zone X9a.

Deer Herds: See Zone X-9a.

49. A-17 Hunt (Zone X-9b Archery Hunt)

Season: The archery season for hunt A-17 (Zone X-9b Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-600

Herd Statistics: See Zone X-9b.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows: See Zone X-9b.

Deer Herds: See Zone X-9b.

50. A-18 Hunt (Zone X-9c Archery Hunt)

Season: The archery season for hunt A-18 (Zone X-9c Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-500

Herd Statistics: See Zone X-9c.
Estimated 2004 hunter harvest: 9

The legal boundary description of the project area is as follows: See Zone X9c.

Deer Herds: See Zone X-9c.

51. A-19 Hunt (Zone X-10 Archery Hunt)

Season: The archery season for hunt A-19 (Zone X-10 Archery Hunt) shall open on the third Saturday in August and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-200

Herd Statistics: See Zone X-10.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows: See Zone X-10.

Deer Herds: See Zone X-10.

52. A-20 Hunt (Zone X-12 Archery Hunt)

Season: The archery season for hunt A-20 (Zone X-12 Archery Hunt) shall open on the third Saturday in August and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-500

Herd Statistics: See Zone X-12.
Estimated 2004 hunter harvest: 18

The legal boundary description of the project area is as follows: See Zone X-12.

Deer Herds: See Zone X-12.

53. A-21 Hunt

Season: The season for hunt A-21 (Anderson Flat Archery Buck Hunt) shall open on the second Saturday in November and extend for 14 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-100

Herd Statistics: See Zone D-6.
Estimated 2004 hunter harvest: 3

The legal boundary description of the project area is as follows:

In that portion of hunt Zone D-6 in Mariposa and Tuolumne counties lying within a line beginning at the intersection of Highway 140 and Bull Creek Road at Briceburg; north on Bull Creek Road (U.S. Forest Service Road 2S05) to Greeley Hill Road; west on Greeley Hill Road to Smith Station Road (County Route J20); north on Smith Station Road to Highway 120 (near Burch Meadow); east on Highway 120 to the Yosemite National Park Boundary (near Big Oak-Flat Ranger Station); southeast along the Yosemite National Park Boundary to Highway 140; west on Highway 140 to the Yosemite National Park Boundary; northwest along the Yosemite National Park Boundary to Highway 140 (at Redbud Campground); west on Highway 140 to the point of beginning.

Deer Herd: Yosemite

54. A-22 Hunt

Season: The season for hunt A-22 (San Diego Archery Either-Sex Deer Hunt) shall open on the first Saturday in September and extend for 44 consecutive days, and reopen on the third Saturday in November and extend through December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 100-1,000

Herd Statistics: See Zone D-16.
Estimated 2004 hunter harvest: 35

The legal boundary description of the project area is as follows:

That portion of San Diego County within Zone D-16 (see subsection 360(a)(15)(A)).

Deer Herd: San Diego

55. A-24 Hunt

Season: The season for hunt A-24 (Monterey Archery Either-Sex Deer Hunt) shall open on the second Saturday in October and extend for 30 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 25-200

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 14

The legal boundary description of the project area is as follows:

All of Monterey County, except Fort Ord Military Reservation.

Deer Herd: Santa Lucia

56. A-25 Hunt

Season: The season for hunt A-25 (Lake Sonoma Either-Sex Deer Hunt) is for Saturdays, Sundays and Mondays only, beginning on the first Saturday in October and extending for 24 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.
Number of Tags: 20-75

Special Conditions:
1. The use of dogs is prohibited.
2. Boats are required for all areas west of Cherry Creek (some 2/3 0f the hunt area). Only cartop boats are allowed to launch from the Yorty Creek access.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 10

The legal boundary description of the project area is as follows:

That portion of Sonoma County within the boundaries of the Lake Sonoma Area, U.S. Army Corps of Engineers (COE) property described as follows: Beginning at the intersection of Hot Springs Road and the COE boundary; east and south along the boundary line to the intersection with Brush Creek; west along the north bank of Brush

Creek (shoreline) to the Dry Creek arm of Lake Sonoma; south along the shoreline of Dry Creek arm; to Smittle Creek; north along the COE property line to Dry Creek; east along the COE boundary across Cherry Creek, Skunk Creek, and Yorty Creek to the point of beginning.

Deer Herd: Santa Rosa

57. A-26 Hunt

Season: The season for hunt A-26 (Bass Hill Archery Buck Deer Hunt) shall open on the third Saturday in November and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-100

Herd Statistics: See Zone X-6a.
Estimated 2004 hunter harvest: 11

The legal boundary description of the project area is as follows:

That portion of Lassen County within the area described as Zone X-6a (see subsection 360(b)(8)(A)).

Deer Herd: Doyle

58. A-27 Hunt

Season: The season for hunt A-27 (Devil's Garden Archery Buck Hunt) shall open on the fourth Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-75

Herd Statistics: See Zone X-2.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows:

That portion of Modoc County within a line beginning at the intersection of the Malin Road (Modoc County 114) and the California/Oregon state line; east along the state line to the Crowder Flat Road; south along the Crowder Flat Road to the Blue Mountain

Road (Modoc County 136); west on the Blue Mountain Road to the Blue Mountain-Mowitz Butte-Ambrose Road; south on the Blue Mountain-Mowitz Butte-Ambrose Road to Highway 139; north on Highway 139 to the Malin Road; north on the Malin Road to the point of beginning.

Deer Herds: Devil's Garden/Interstate

59. A-30 Hunt

Season: The season for hunt A-30 (Covelo Archery Buck Hunt) shall open on the second Saturday of November and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 20-100

Herd Statistics: See Zone B-1.
Estimated 2004 hunter harvest: 9

The legal boundary description of the project area is as follows:

That portion of Mendocino County within a line beginning at the intersection of Highway 101 and the Humboldt-Mendocino county line; east along the Humboldt-Mendocino county line to the Trinity-Mendocino county line; east along the Trinity-Mendocino county line to the Mendocino-Tehama county line; south on the Mendocino-Tehama county line to the Mendocino-Glenn county line; south on the Mendocino-Glenn county line to the Mendocino-Lake county line; west and south on the Mendocino-Lake county line to the Main Eel River; west and north on the Main Eel River to the Hearst-Willits Road; southwest on the Hearst-Willits Road to Commercial Avenue; west on Commercial Avenue to Highway 101; north on Highway 101 to the point of beginning.

Deer Herd: Mendocino

60. A-31 Hunt

Season: The season for hunt A-31 (Los Angeles Archery Either-Sex Deer Hunt) shall open on the fourth Saturday in September and extend through December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.
Number of Tags: 200-2,000

Number of Tags: 10-80 (military and general public).

Special Conditions: In the event the Commanding Officer cancels the hunt, G-8 tagholders will only have the option of exchanging the unused tag for any remaining deer tag or receiving a refund.

Herd Statistics: See Zone A
Estimated 2004 hunter harvest: 33

The legal boundary description of the project area is as follows:

That portion of Monterey County lying within the exterior boundaries of the Hunter Liggett Military Reservation, except as restricted by the Commanding Officer.

Deer Herd: Santa Lucia

68. G-9 Hunt

Season: The season for additional hunt G-9 (Camp Roberts Antlerless Deer Hunt) shall open the last Monday in August and extend for 8 consecutive days, except if rescheduled by the Commanding Officer with Department concurrence between the season opener and December 31..

Bag and Possession Limit: One antlerless deer (see subsection 351(b), Title 14, CCR) per tag.

Number of Tags: 30 (15 military and 15 general public)

Special Conditions: In the event the Commanding Officer cancels the hunt, G-9 tagholders will only have the option of exchanging the unused tag for any remaining deer tag or receiving a refund.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 21

The legal boundary description of the project area is as follows:

That portion of San Luis Obispo County lying within the exterior boundaries of Camp Roberts, except as restricted by the Commanding Officer.

Deer Herd: Adelaida

69. G-10 Hunt

Season: The season for additional hunt G-10 (Camp Pendleton Either-Sex Deer Hunt) shall be open on Saturdays, Sundays, the Columbus and Veterans Day Holidays and the day after Thanksgiving only beginning the third Saturday in September and extend through the Sunday following the Thanksgiving Day holiday, except if rescheduled by the Commanding Officer with Department concurrence between the season opener and December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 100-480 (military only)

Special Conditions:
1) Only archery equipment is permitted during the first four weekends of the season.
2) Hunting with firearms is permitted beginning on the fifth weekend through the end of season.
3) A permit fee and method of take registration with the Base are required.
4) In the event the Commanding Officer cancels the hunt, G-10 tagholders will only have the option of exchanging the unused tag for any remaining deer tag or receiving a refund.

Herd Statistics: See Zone D-15.
Estimated 2004 hunter harvest: 44

The legal boundary description of the project area is as follows:

That portion of San Diego County lying within the exterior boundaries of the U.S. Marine Corps Base, Camp Joseph Pendleton.

Deer Herd: Santa Ana Mountains

70. G-11 Hunt

Season: The season for additional hunt G-11 (Vandenberg Either-Sex Deer Hunt) shall open on the last Monday in August and extend through December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 500 (military and Department of Defense employees only)

Special Conditions: In the event the Commanding Officer cancels the hunt, G-11 tagholders will only have the option of exchanging the unused tag for any remaining deer tag or receiving a refund.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 71

The legal boundary description of the project area is as follows:

That portion of Santa Barbara County lying within the exterior boundaries of Vandenberg Air Force Base.

Deer Herd: Santa Barbara

71. G-12 Hunt

Season: The season for additional hunt G-12 (Gray Lodge Shotgun Either-Sex Deer Hunt) shall open on the third Saturday in September and extend for nine consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 25-75

Special Conditions: Only shotguns and ammunition, as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone D-3.
Estimated 2004 hunter harvest: 9

The legal boundary description of the project area is as follows:

Those portions of Butte and Sutter counties within the exterior boundaries of the Gray Lodge State Wildlife Area.

Deer Herd: Mother Lode

72. G-13 Hunt

Season: The season for additional hunt G-13 (San Diego Antlerless Deer Hunt) shall open on the fourth Saturday in October and extend for 23 consecutive days.

Bag and Possession Limit: One antlerless deer (see subsection 351(b), Title 14, CCR) per tag.

Number of Tags: 50-300

Herd Statistics: See Zone D-16.
Estimated 2004 hunter harvest: 32

The legal boundary description of the project area is as follows:

That portion of San Diego County within Zone D-16 (see subsection 360(a)(15)(A)).

Deer Herd: San Diego

73. G-19 Hunt

Season: The season for additional hunt G-19 (Sutter-Yuba Wildlife Areas Either-Sex Deer Hunt) shall open on the fourth Saturday in September and extend through December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 10-65

Special Conditions: Only archery equipment and crossbows (as specified in Section 354) and shotguns and ammunition (as specified in Section 353) may be used.

Herd Statistics: See Zone D-4.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows:

Those portions of Yuba and Sutter counties within the exterior boundaries of: (1) the Feather River Wildlife Area, and (2) the Sutter Bypass Wildlife Area (as defined in Section 550, Title 14, CCR).

Deer Herd: Mother Lode

74. G-21 Hunt

Season: The season for additional hunt G-21 (Ventana Wilderness Buck Hunt) shall open on the second Saturday in November and extend for 23 consecutive days.

Bag and Possession Limit: One buck, forked (see subsection 351(a), Title 14 CCR) or better, per tag.

Number of Tags: 25-100

Herd Statistics: See Zone A.

Estimated 2004 hunter harvest: 5

The legal boundary description of the project area is as follows:

That portion of Monterey County and the Los Padres National Forest within the exterior boundaries of the Ventana Wilderness Area.

Deer Herd: Santa Lucia

75. G-37 Hunt

Season: The season for additional hunt G-37 (Anderson Flat Buck Hunt) shall open on the fourth Saturday in November and extend for nine consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 25-50

Herd Statistics: See Zone D-6.
Estimated 2004 hunter harvest: 8

The legal boundary of the project area is as follows:

In that portion of hunt Zone D-6 in Mariposa and Tuolumne counties lying within a line beginning at the intersection of Highway 140 and Bull Creek Road at Briceburg; north on Bull Creek Road (U.S. Forest Service Road 2S05) to Greeley Hill Road; west on Greeley Hill Road to Smith Station Road (County Route J20); north on Smith Station Road to Highway 120 (near Burch Meadow); east on Highway 120 to the Yosemite National Park Boundary (near Big Oak-Flat Ranger Station); southeast along the Yosemite National Park Boundary to Highway 140; west on Highway 140 to the Yosemite National Park Boundary; northwest along the Yosemite National Park Boundary to Highway 140 (at Redbud Campground); west on Highway 140 to the point of beginning.

Deer Herd: Yosemite

76. G-38 Hunt

Season: The season for additional hunt G-38 (X-10 Late Season Buck Hunt) shall open on the third Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 50-300

Herd Statistics: See Zone X-10.
Estimated 2004 hunter harvest: 16

The legal boundary of the project area is as follows:

In those portions of Kern, Tulare and Inyo counties within a line beginning at the intersection of Highway 178 and the Doyle Ranch Road in the town of Onyx; north along the Doyle Ranch Road to the South Fork of the Kern River; north along the South Fork of the Kern River to the Chimney Meadow-Blackrock Station Road (Forest Road 21S03); northwest along the Chimney Meadow-Blackrock Station Road through Troy Meadows to the road's end at the Inyo and Sequoia National Forest boundary near Blackrock Mountain; northwest along the Inyo and Sequoia National Forest boundary to the main Kern River; northwest along the main Kern River to the Sequoia National Park boundary; northeast along the Sequoia National Park boundary to the Inyo-Tulare County line; southeast along the Inyo-Tulare County line to the Cottonwood Pass Trail at Cottonwood Pass; east along the Cottonwood Pass Trail through Horseshoe Meadow to the Horseshoe Meadow Road; north along the Horseshoe Meadow Road to Cottonwood Creek; southeast along Cottonwood Creek to Highway 395; south along Highway 395 to Highway 14; south along Highway 14 to Highway 178; north and west along Highway 178 to the point of beginning.

Deer Herd: Monache

77. G-39 Hunt

Season: The season for additional hunt G-39 (Round Valley Late Season Buck Hunt) shall open on the fourth Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-150

Herd Statistics: See Zone X-9a.
Estimated 2004 hunter harvest: 25

The legal boundary description of the project area is as follows:

In that portion of Inyo and Mono counties within a line beginning at the intersection of U.S. Highway 395 and California Highway 168; west and south along Highway 168 to the North Lake Road turnoff; west along the North Lake Road and the Piute Pass Trail to the Inyo-Fresno county line; north along the Inyo-Fresno county line to the Mono-Fresno county line; north along the Mono-Fresno and Mono-Madera county lines to the

junction of the Mono-Madera county line and California Highway 203 at Minaret Summit; southeast along Highway 203 to its junction with Highway 395; south along Highway 395 to the point of beginning.

Deer Herd: Buttermilk, Sherwin Grade

78. M-3 Hunt

Season: The season for additional hunt M-3 (Doyle Muzzleloading Rifle Buck Hunt) shall open on the third Saturday in November and extend for nine consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 20-75

Special Conditions: Only muzzleloading rifles as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone X-6b.
Estimated 2004 hunter harvest: 13

The legal boundary description of the project area is as follows:

That portion of Lassen County within the area described as X-6b (see subsection 360(b)(9)(A)).

Deer Herd: Doyle

79. M-4 Hunt

Season: The season for additional hunt M-4 (Horse Lake Muzzleloading Rifle Buck Hunt) shall open on the fourth Saturday in October and extend for nine consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-50

Special Conditions: Only muzzleloading rifles as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone X-5A.
Estimated 2004 hunter harvest: 4

That portion of Lassen County within the area described as X-5a (see subsection 360(b)(6)(A)).

Deer Herd: East Lassen

80. M-5 Hunt

Season: The season for additional hunt M-5 (East Lassen Muzzleloading Rifle Buck Hunt) shall open on the fourth Saturday in October and extend for nine consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-50

Special Conditions: Only muzzleloading rifles as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone X-5b.
Estimated 2004 hunter harvest: 4

The legal boundary description of the project area is as follows:

That portion of Lassen County within the area described as Zone X-5b (see subsection 360(b)(7)(A).

Deer Herd: East Lassen

81. M-6 Hunt

Season: The season for additional hunt M-6 (San Diego Muzzleloading Rifle Either-Sex Deer Hunt) shall open on the third Saturday in December and extend through December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.
Number of Tags: 25-100

Special Conditions: Only muzzleloading rifles as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone D-16.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows:

That portion of San Diego County within Zone D-16 (see subsection 360(a)(15)(A)).

Deer Herd: San Diego

82. M-7 Hunt

Season: The season for additional hunt M-7 (Ventura Muzzleloading Rifle Either-Sex Deer Hunt) shall open on the last Saturday in November and extend for 16 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 50-150

Special Conditions: Only muzzleloading rifles as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone D-13.
Estimated 2004 hunter harvest: 28

The legal boundary description of the project area is as follows:

All of Ventura County.

Deer Herd: Santa Barbara

83. M-8 Hunt

Season: The season for additional hunt M-8 (Bass Hill Muzzleloading Rifle Buck Deer Hunt) shall open on the fourth Saturday in October and extend for nine consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-75

Special Conditions: Only muzzleloading rifles as specified in Section 353, Title 14, CCR, may be used.

Herd Statistics: See Zone X-6a.

Estimated 2004 hunter harvest: 8

The legal boundary description of the project area is as follows:

That portion of Lassen County within the area described as Zone X-6a (see subsection 360(b)(8)(A)).

Deer Herd: Doyle

84. M-9 Hunt

Season: The season for additional hunt M-9 (Devil's Garden Muzzleloading Rifle Buck Hunt) shall open on the fourth Saturday in October and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-100

Special Conditions: Only muzzleloading rifles as specified in Section 353 may be used.

Herd Statistics: See Zone X-2.
Estimated 2004 hunter harvest: 7

The legal boundary description of the project area is as follows:

That portion of Modoc County within a line beginning at the intersection of the Malin Road (Modoc County 114) and the California/Oregon state line; east along the state line to the Crowder Flat Road; south along the Crowder Flat Road to the Blue Mountain Road (Modoc County 136); west on the Blue Mountain Road to the Blue Mountain-Moitz Butte-Ambrose Road; south on the Blue Mountain-Mowitz Butte-Ambrose Road to Highway 139; north on Highway 139 to the Malin Road; north on the Malin Road to the point of beginning.

Deer Herd: Devil's Garden/Interstate

85 M-11 Hunt

Season: The season for additional hunt M-11 (Northwestern California Muzzleloading Rifle Buck Hunt) shall open on the second Saturday in November and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 20-200

Special Conditions: Only muzzleloading rifles as specified in Section 353 may be used.

Herd Statistics: See Zone B-1.
Estimated 2004 hunter harvest: 4

The legal boundary description of the project area is as follows:

Those portions of Del Norte, Glenn, Humboldt, Lake, Mendocino, Siskiyou, and Trinity counties within the area described as Zone B-1 (see subsection 360(a)(2)(A)1).

Deer Herd: Mendocino, Clear Lake, Mad River, Redwood Creek, Ruth, Smith River

86. MA-1 Hunt

Season: The season for additional hunt MA-1 (San Luis Obispo Muzzleloading Rifle/Archery Either-Sex Deer Hunt) shall open the last Saturday in November and extend for 16 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 20-150

Special Conditions: Only archery equipment as specified in Section 354 or muzzleloading rifles as specified in Section 353 may be used.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 18

The legal boundary description of the project area is as follows:

That portion of San Luis Obispo County lying within the Los Padres National Forest.

Deer Herds: Adelaida, Pozo

87. MA-3 Hunt

Season: The season for additional hunt MA-3 (Santa Barbara Muzzleloading Rifle/Archery Buck Hunt) shall open on the last Saturday in November and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 20-150

Special Conditions: Only muzzleloading rifles as specified in Section 353 and archery equipment as specified in Section354 may be used.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 18

The legal boundary description of the project area is as follows:

All of Santa Barbara County.

Deer Herd: Santa Barbara

88. J-1 Hunt

Season: The season for additional hunt J-1 (Lake Sonoma Junior Either-sex Deer Hunt) shall open on the first Saturday in November and extend for two consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 10-25

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.
3. Tagholders shall attend an orientation meeting the day before the opening day of the season.
4. The use of dogs is prohibited.
5. Boats are required for all areas west of Cherry Creek (some 2/3 of the hunt area). Only cartop boats are allowed to launch from the Yorty Creek access.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 9

The legal boundary description of the project area is as follows:

That portion of Sonoma County within the boundaries of the Lake Sonoma Area, U.S. Army Corps of Engineers (COE) property described as follows: Beginning at the intersection of Hot Springs Road and the COE boundary; east and south along the boundary line to the intersection with Brush Creek; west along the north bank of Brush

Creek (shoreline) to the Dry Creek arm of Lake Sonoma; south along the shoreline of the Dry Creek arm to Smittle Creek; north along the COE property line to Dry Creek; east along the COE boundary across Cherry Creek, Skunk Creek, and Yorty Creek to the point of beginning.

Deer Herd: Santa Rosa

89. J-3 Hunt

Season: The season for additional hunt J-3 (Tehama Wildlife Area Junior Buck Hunt) shall begin on the last Saturday in November and extend for two consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 15-30

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.
3. Tagholders shall attend an orientation meeting the day before the opening day of the season.

Herd Statistics: See Zone C-4.
Estimated 2004 hunter harvest: 5

The legal boundary description of the project area is as follows:

That portion of Tehama County within the boundaries of the Tehama Wildlife Area.

Deer Herd: Tehama

90. J-4 Hunt

Season: The season for additional hunt J-4 (Shasta-Trinity Junior Buck Hunt) shall open on the fourth Saturday in November and extend for nine consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 15-50

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).

2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone B-2.
Estimated 2004 hunter harvest: 8

The legal boundary description of the project area is as follows:

In those portions of Shasta and Trinity counties beginning at the junction of Highway 3 and Highway 299 in Weaverville; north on Highway 3 to the East Side Road at the north end of Trinity Lake; east on the East Side Road to Dog Creek Road; east on Dog Creek Road to Interstate 5 at Vollmers; south on Interstate 5 to Shasta Lake; south along the west shore of Shasta Lake to Shasta Dam; south along Shasta Dam along the Sacramento River to Keswick Dam Road; west on Keswick Dam Road to Rock Creek Road; south on Rock Creek Road to Highway 299; west on Highway 299 to the point of beginning.

Deer Herd: Weaverville

91. J-7 Hunt

Season: The season for additional hunt J-7 (Carson River Junior Either-Sex Deer Hunt) shall open on the first Saturday following the closure of the X-8 general season (see subsection 360(b)(12)(B), Title 14, CCR) and extend for nine consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 10-30

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone X-8.
Estimated 2004 hunter harvest: 7

The legal boundary description of the project area is as follows:

That portion of Alpine County within the area described as Zone X-8 (see subsection 360(b)(12)(A)).

Deer Herd: Carson River

92. J-8 Hunt

Season: The season for additional hunt J-8 (Daugherty Hill Wildlife Area Junior Either-Sex Deer Hunt) shall open on the first Saturday in December and extend through December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 10-20

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.
3. Tag holders shall attend an orientation meeting the day before the opening day of the season.

Herd Statistics: See Zone D-3.
Estimated 2004 hunter harvest: 3

The legal boundary description of the project area is as follows:

That portion of Yuba County within the exterior boundaries of the Daugherty Hill Wildlife Area (as defined in Section 550, Title 14, CCR).

Deer Herd: Mooretown

93. J-9 Hunt

Season: The season for additional hunt J-9 (Little Dry Creek Junior Shotgun Either-Sex Deer Hunt) shall open on the third Saturday in September and extending for 9 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 5-10

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

3. Tag holders shall attend an orientation meeting the day before the opening day of the season.
4. Only shotguns and ammunition as specified in Section 353 may be used.

Herd Statistics: See Zone D-3.
Estimated 2004 hunter harvest: 2

The legal boundary description of the project area is as follows:

That portion of Butte County within the exterior boundaries of the Little Dry Creek Unit Upper Butt Basin Wildlife Area (as defined in Section 550, Title 14, CCR).

Deer Herd: Mother Lode

94. J-10 Hunt

Season: The season for additional hunt J-10 (Fort Hunter Liggett Junior Either-Sex Deer Hunt) shall be open Saturdays, Sundays, and the Columbus Day holiday only beginning the first Saturday in October and extend for two consecutive weekends, except if rescheduled by the Commanding Officer with Department concurrence between the season opener and December 31.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 10-80 (military and general public)

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.
3. Tagholders shall attend an orientation meeting the day before the opening day of the season.
4. In the event the Commanding Officer cancels the hunt, J-10 tagholders will only have the option of exchanging the unused tag for any remaining deer tag or receiving a refund.

Herd Statistics: See Zone A.
Estimated 2004 hunter harvest: 34

The legal boundary description of the project area is as follows:

That portion of Monterey County lying within the exterior boundaries of the Fort Hunter Liggett Military Reservation, except as restricted by the Commanding Officer.

Deer Herd: Santa Lucia

95. J-11 Hunt

Season: The season for additional hunt J-11 (San Bernardino Junior Either-Sex Deer Hunt) shall open on the third Saturday in November and extend for 9 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 10-50

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-14.
Estimated 2004 hunter harvest: 10

The legal boundary description of the project area is as follows:

In those portions of D-14 (as described in subsection 360(a)(13)(A)) within San Bernardino County.

Deer Herd: San Bernardino Mountains

96. J-12 Hunt

Season: The season for additional hunt J-12 (Round Valley Junior Buck Hunt) shall open on the first Saturday in December and extend for 16 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 10-20

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone X-9a.
Estimated 2004 hunter harvest: 3

The legal boundary description of the project area is as follows:

In that portion of Inyo and Mono counties within a line beginning at the intersection of U.S. Highway 395 and California Highway 168; west and south along Highway 168 to the North Lake Road turnoff; west along the North Lake Road and the Piute Pass Trail to the Inyo-Fresno county line; north along the Inyo-Fresno county line to the Mono-Fresno county line; north along the Mono-Fresno and Mono-Madera county lines to the junction of the Mono-Madera county line and California Highway 203 at Minaret Summit; southeast along Highway 203 to its junction with Highway 395; south along Highway 395 to the point of beginning.

Deer Herd: Buttermilk, Sherwin Grade

97. J-13 Hunt

Season: The season for additional hunt J-13 (Los Angeles Junior Either-Sex Deer Hunt) shall open on the third Saturday in November and extend for 9 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 25-100

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-11.
Estimated 2004 hunter harvest: 5

The legal boundary description of the project area is as follows:

In that portion of Los Angeles County within Zone D-11 (see subsection 360(a)(10)(A)).
Deer Herd: Los Angeles

98. J-14 Hunt

Season: The season for additional hunt J-14 (Riverside Junior Either-Sex Deer Hunt) shall open on the third Saturday in November and extend for 9 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c), Title 14, CCR) per tag.

Number of Tags: 15-75

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-19.
Estimated 2004 hunter harvest: 8

The legal boundary description of the project area is as follows:

In that portion of Riverside County within Zone D-19 (see subsection 360(a)(17)(A)).

Deer Herd: San Jacinto/Santa Rosa Mountains

99. J-15 Hunt

Season: The season for additional hunt J-15 (Anderson Flat Junior Buck Hunt) shall open on the fourth Saturday in November and extend for 9 consecutive days.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5-30

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-6.
Estimated 2004 hunter harvest: 4

The legal boundary description of the project area is as follows:

In that portion of hunt Zone D-6 in Mariposa and Tuolumne counties lying within a line beginning at the intersection of Highway 140 and Bull Creek Road at Briceburg; north on Bull Creek Road (U.S. Forest Service Road 2S05) to Greeley Hill Road; west on Greeley Hill Road to Smith Station Road (County Route J20); north on Smith Station Road to Highway 120 (near Burch Meadow); east on Highway 120 to the Yosemite National Park Boundary (near Big Oak-Flat Ranger Station); southeast along the Yosemite National Park Boundary to Highway 140; west on Highway 140 to the Yosemite National Park Boundary; northwest along the Yosemite National Park

Boundary to Highway 140 (at Redbud Campground); west on Highway 140 to the point of beginning.

Deer Herds: Stanislaus, Tuolumne, Yosemite

100. J-16 Hunt

Season: The season for additional hunt J-16 (Bucks Mountain-Blue Canyon Junior Either-Sex Deer Hunt) shall be concurrent with the zone D-3 general season as defined in subsection 360(a)(4)(B).

Bag and Possession Limit: One either-sex deer (see subsection 351(c)) per tag.

Number of Tags: 10-75.

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-3.
Estimated 2004 hunter harvest: 24

The legal boundary description of the project area is as follows:

Excluding Glenn County, in those portions of Butte, Colusa, Nevada, Placer, Plumas, Sierra, Sutter and Yuba Counties within the area described as zone D-3 (see subsection 360(a)(4)(A)1).

Deer Herds: Blue Canyon, Bucks Mountain/Mooretown, Downieville/Nevada City, Mother Lode

101. J-17 Hunt

Season: The season for additional hunt J-17 (Zone D-4 Junior Either-Sex Deer Hunt) shall be concurrent with the zone D-4 general season as defined in subsection 360(a)(4)(B).

Bag and Possession Limit: One either-sex deer (see subsection 351(c)) per tag.

Number of Tags: 5-25.

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).

2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-4.
Estimated 2004 hunter harvest: 3

The legal boundary description of the project area is as follows:

In those portions of Colusa, Nevada, Placer, Sacramento, Sutter, Yolo and Yuba Counties within the area described as zone D-4 (see subsection 360(a)(4)(A)2).

Deer Herds: Blue Canyon, Mother Lode, Nevada City

102.J-18 Hunt

Season: The season for additional hunt J-18 (Pacific-Railroad Flat Junior Either-Sex Deer Hunt) shall be concurrent with the zone D-5 general season as defined in subsection 360(a)(4)(B).

Bag and Possession Limit: One either-sex deer (see subsection 351(c)) per tag.

Number of Tags: 10-75.

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone D-5.
Estimated 2004 hunter harvest: 16

The legal boundary description of the project area is as follows:

Excluding Tuolumne County, in those portions of Alpine, Amador, Calaveras, El Dorado, Placer, Sacramento, San Joaquin, and Stanislaus counties within the area described as zone D-5 (see subsection 360(a)(4)(A)3).

Deer Herds: Carson River, Grizzly Flat, Mother Lode, Pacific, Railroad Flat, Salt Springs

103.J-19 Hunt

Season: The season for additional hunt J-19 (Zone X-7a Junior Either-Sex Deer Hunt) shall be concurrent with the zone X-7a general season as defined in subsection 360(b)(10)(B).

Bag and Possession Limit: One either-sex deer (see subsection 351(c)) per tag.

Number of Tags: 10-40.

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone X-7a.
Estimated 2004 hunter harvest: 11

The legal boundary description of the project area is as follows:

In those portions of Lassen, Nevada, Plumas and Sierra Counties within the area described as zone X-7a (see subsection 360(b)(10)(A)).

Deer Herds: Loyalton/Truckee

104.J-20 Hunt

Season: The season for additional hunt J-20 (Zone X-7b Junior Either-Sex Deer Hunt) shall be concurrent with the zone X-7b general season as described in subsection 360(b)(11)(B).

Bag and Possession Limit: One either-sex deer (see subsection 351(c)) per tag.

Number of Tags: 5-20.

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone X-7b.
Estimated 2004 hunter harvest: 11

The legal boundary description of the project area is as follows:

In those portions of Nevada, Placer and Sierra Counties within the area described as zone X-7b (see subsection 360(b)(11)(A)).

Deer Herds: Loyalton/Truckee

105.J-21 Hunt

Season: The season for additional hunt J-21 (East Tehama Junior Either-Sex Deer Hunt) shall open on the third Saturday in September and extend for 44 consecutive days.

Bag and Possession Limit: One either-sex deer (see subsection 351(c)) per tag.

Number of Tags: 20-80.

Special Conditions:
1. Only junior license holders shall apply (see subsection 708(a)(2)).
2. Tagholders shall be accompanied by an adult chaperon 18 years of age or older while hunting.

Herd Statistics: See Zone C-4.
Estimated 2004 hunter harvest: 20

The legal boundary description of the project area is as follows:

In that portion of Tehama County within the area described as zone C-4 (see subsection 360(a)(3)(A)4.).

Deer Herds: East Tehama

FUND-RAISING HUNTS

106.Golden Opportunity Fund-raising Tag

Season: Golden Opportunity tags shall be valid beginning on the second Saturday in July and extend through December 31.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5

Special Conditions:
1. The holder of a Golden Opportunity tag may take deer using all methods authorized as described in sections 353 and 354, Title 14, CCR.
2. Fund-raising license tagholders who receive a deer tag pursuant to Section 708(a)(2), Title 14, CCR, shall be allowed to exchange that tag under the provisions of subsection 708(a)(2)(F), Title 14, CCR. Tagholders shall not be entitled to obtain more than two (2) deer tags as described in subsection 708(a)(2), Title 14, CCR.

3. Tagholders shall report to the Regional Patrol Chief at the appropriate Department of Fish and Game Regional Headquarters prior to hunting to inform law enforcement officials of the time and area they intend to hunt.

The legal boundary description of the project area is as follows:

Golden Opportunity tags shall be valid statewide on lands legally open for deer hunting.

107. Open Zone Fund-raising Tag

Season: Open Zone tags shall be valid during the authorized seasons described for the general deer zones, additional deer hunts and area-specific archery hunts in subsections 360(a), (b), (c) and subsections 361(a) and (b), Title 14, CCR.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, per tag.

Number of Tags: 5

Special Conditions:
1. The holder of an Open Zone tag shall meet any special conditions and take deer using the method of take authorized for the general deer zone, additional deer hunt, or area-specific archery hunt as described in subsections 360(a), (b), (c) and subsections 361(a) and (b), Title 14, CCR.
2. Fund-raising license tagholders who receive a deer tag pursuant to Section 708(a)(2), Title 14, CCR, shall be allowed to exchange that tag under the provisions of Section 708(a)(2)(F), Title 14, CCR. Tagholders shall not be entitled to obtain more than two (2) deer tags as described in subsection 708(a)(2), Title 14, CCR.
3. Tagholders shall report to the Regional Patrol Chief at the appropriate Department of Fish and Game Regional Headquarters prior to hunting to inform law enforcement officials of the time and area they intend to hunt.

The legal boundary description of the project area is as follows:

Open Zone tags shall be valid in the general deer zones, additional deer hunts, and area-specific archery hunts as described in subsections 360(a), (b), (c) and subsections 361(a) and (b), Title 14, CCR.

108. Cooperative Deer Hunting Area hunts (Section 554, Title 14, CCR).

In 2003, a total of 155 tags were issued through the Section 554 - Cooperative Deer Hunting Area Program.

Season: Section 554 - Cooperative Deer Hunting Area seasons correspond to the general season for the X zone in which they are issued.

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better per tag.

Number of Tags: Buck Tags: 0-1,000

Special Conditions:

a. A Section 554 - Cooperative Deer Hunting Area may consist of private land under the control of one or more owners, at least 640 acres in size, within, or adjacent to 5,000 acres of critical deer habitat in deer quota zones (see Section 360) which require public drawing for the distribution of deer tags (see Section 708).
b. Applicants for Section 554 - Cooperative Deer Hunting Area permits shall be the owner of said land.
c. No individual may submit more than one Section 554 - Cooperative Deer Hunting Area application or deer tag application per deer season, nor may there be more than two cooperative deer hunting area applicants for a given parcel of land.
d. To obtain a Section 554 - Cooperative Deer Hunting Area deer tag, applicants must submit a 2004 One Deer Tag Application for exchange with their area application.
e. Deer tags issued pursuant to a Section 554 - Cooperative Deer Hunting Area permit are valid only during the season for the deer zone specified and may only be used on private lands specified in the landowner's application.

Herd Statistics: See specific X zone in which individual Section 554 - Cooperative Deer Hunting Area is located.

2003 hunter harvest: 32 bucks

The legal boundary description of the project areas is as follows:

Private lands, properly posted, as identified within the approved Section 554 - Cooperative Deer Hunting Area application.

109. Private Lands Wildlife Habitat Enhancement and Management (PLM) Area Program hunts (Section 601, Title 14, CCR).

In 2003, 74 PLMs encompassing 846,792 acres statewide were licensed in the program. Fifty-nine of these areas included deer hunting as part of their management program.

Season: PLM seasons vary depending upon the location of the area, the number of deer to be harvested, and the length of time the area has been in the program (no variation from the general season for the zone in which the PLM is located is permitted during a PLM's initial year).

Bag and Possession Limit: One buck, forked horn (see subsection 351(a), Title 14, CCR) or better, or one antlerless deer (see subsection 351(b), Title 14, CCR) per tag. Buck, antlerless, and either-sex deer tags are options for PLM areas.

Number of Tags:	Buck Tags:	100-1,200
	Antlerless Tags:	100-1,200
	Either-Sex Tags:	100-1,200

Special Conditions:

a. In order to purchase a PLM tag, hunters must exchange a valid 2004 California deer tag application, or a valid, unfilled 2004 California deer tag with the PLM area they wish to hunt.
b. No person shall take more than one buck deer in the X zones, as defined in subsection 360(b).

Herd Statistics: See zone in which individual PLM is located.
2003 hunter harvest: 638 (472 bucks and 166 does)

The legal boundary description of the project areas is as follows:

Private lands, properly posted, as identified within the individual PLM management plans.

METHODS OF TAKE

Methods for taking big game, including deer are regulated under the provisions of Section 353, Title 14, CCR. These restrictions are as follows:

Except for the provisions of subsections 353(b) through (g), Title 14, CCR, big game (as defined by Section 350, title 14, CCR) may only be taken by rifles using centerfire cartridges with softnose or expanding bullets; bow and arrow (see Section 354, Title 14, CCR, for archery equipment regulations); or wheellock, matchlock, flintlock or percussion type, including "in-line" muzzleloading rifles using black powder or equivalent black powder substitute, including pellets, with single ball or bullet loaded from the muzzle and at least .40 caliber in designation.

Shotguns capable of holding not more than three shells firing single slugs may be used for the taking of deer, bear and wild pigs. In areas where the discharge of rifles or shotguns with slugs is prohibited by county ordinance, shotguns capable of holding not more than three shells firing size 0 or 00 buckshot may be used for the taking of deer only.

Pistols and revolvers using centerfire cartridges with softnose or expanding bullets may be used to take deer, bear, and wild pigs.

Pistols and revolvers with minimum barrel lengths of 4 inches, using centerfire cartridges with softnose or expanding bullets may be used to take elk and bighorn sheep.

Except as provided in subsection 354(j), crossbows may be used to take deer and wild pigs only during the regular seasons.

Under the provisions of a muzzleloading rifle only tag, hunters may only possess muzzleloading rifles as described in subsection 353(a) equipped with open or "peep" type sights only.

Under the provisions of a muzzleloading rifle/archery tag, hunters may only possess muzzleloading rifles with sights as described in subsection 353(f); archery equipment as described in Section 354; or both. For purposes of this subsection, archery equipment does not include crossbows, except as provided in subsection 354(j).

Except as otherwise provided, while taking or attempting to take big game under the provisions of Section 353 or Section 354, Title 14, CCR, it is unlawful to use any device or devices which: 1) throw, cast or project an artificial light or electronically alter or intensify a light source for the purpose of visibly enhancing an animal; or 2) throw, cast or project an artificial light or electronically alter or intensify a light source for the purpose of providing a visible point of aim directly on a animal. Devices commonly referred to as "sniperscopes", night vision scopes or binoculars, or those utilizing infra-red, heat sensing or other non-visible spectrum light technology used for the purpose of visibly enhancing an animal or providing a visible point of aim directly on a animal are prohibited and may not be possessed while taking or attempting to take big game. Devices commonly referred to as laser rangefinders, "red-dot" scopes with self-illuminating reticles, and fiberoptic sights with self illuminating sight or pins which do not throw, cast or project a visible light onto an animal are permitted.

Archery equipment during archery deer seasons is regulated under Section 354, Title 14, CCR. The archery restrictions are as follows:

Bow, as used in the regulations, means any device consisting of a flexible material having a string connecting its two ends and used to propel an arrow held in a firing position by hand only. Bow includes long bow, recurve or compound bow.

Crossbow, as used in the regulations, means any device consisting of a bow or cured latex band or other flexible material (commonly referred to as a linear bow) affixed to a stock or any bow that utilizes any device attached directly or indirectly to the bow for the purpose of keeping a crossbow bolt, an arrow or the string in a firing position. Except as provided in subsection 354(j), a crossbow is not archery equipment and cannot be used during the archery deer season.

For the taking of big game, hunting arrows and crossbow bolts with a broad head type blade which will not pass through a hole seven-eighths inch in diameter shall be used. Mechanical/retractable broad heads shall be measured in the open position. For the taking of migratory game birds, resident small game, furbearers and nongame mammals and birds any arrow or crossbow bolt may be used except as prohibited by subsection (d) below.

No arrows or crossbow bolts with an explosive head or with any substance which would tranquilize or poison any animal may be used.

No arrow or crossbow bolt may be released from a bow or crossbow upon or across any highway, road or other way open to vehicular traffic.

No bow or crossbow may be used which will not cast a legal hunting arrow, except flu-flu arrows, a horizontal distance of 130 yards.

Except as described in subsection 354(j), crossbows may not be used to take game birds and game mammals during archery seasons.

Except as provided in subsection 353(g), archers may not possess a firearm while hunting in the field during any archery season, or while hunting during a general season under the provisions of an archery only tag.

No person may nock or fit the notch in the end of an arrow to a bowstring or crossbow string in a ready-to-fire position while in or on any vehicle.

Persons with a physical disability preventing them being able to draw and hold a bow in a firing position, may use a crossbow or device which holds a string and arrow in the firing position to assist in the taking of birds and mammals under the conditions of an archery tag, archery season, or general season. Under these conditions, archers must provide the Department and retain in his/her immediate possession written verification of the disability, including: the person's name and signature, address, date of birth, driver's license or DMV number; physician's name and signature, physician's license number and address; and a description of the disability and the term for which the disability may apply.

In addition to the limitation on equipment, the Commission regulates the use of dogs to aid in the take of deer. Subsection 265(c)(1), Title 14, CCR, restricts the use of dogs during the general deer season to no more than one dog per hunter in the area where the general deer season is open, except during the general bear season (after the second Saturday in October), when there is no limit on the number of dogs used. The overlap between deer seasons and the proposed bear season varies by hunt zone. In the X zones, an overlap does not exist. In the A, B, C, and D zones, the two seasons will be concurrent and dogs may not be used to hunt bears before the second Saturday in October.

DEER LICENSE TAG: APPLICATION, DISTRIBUTION AND USE PROCEDURES

Deer License Tags.

No person shall hunt deer without a valid deer license tag in possession for that particular area as defined in sections 360 and 361. Deer shall be tagged only with a valid deer license tag for the area (as defined in sections 360 and 361) in which the deer is killed. Except as otherwise provided in the Fish and Game Code, no person shall take more than two deer during any license year.

Deer License Tag Application and Distribution Procedures.

Distribution of License Tags:

Premium deer hunt tags for X zones, additional hunts, and area-specific archery hunts shall be distributed by drawing, as described in subsection708 (g)(1) and (2), unless otherwise authorized. Applicants shall submit their deer tag application to the Department of Fish and Game, License and Revenue Branch, 3211 S Street, Sacramento, California 95816 (or by mail to Post Office Box 949035, West Sacramento, California 95798-9035). Applications must be received by the department by 5:00 p.m. on the first business day after June 1. Successful applicants will be selected by drawing within 10 calendar days following the application deadline date. If the drawing is delayed due to circumstances beyond the department's control, the department shall conduct the drawing at the earliest date possible. Successful and unsuccessful applicants will be notified by mail.

Except as noted in subsection 708 (a)(2)(E) below, deer tags for A, B, C, and D zones and leftover drawing tags shall be issued upon request until each tag quota fills. If, on any given day, the number of applications received for any zone or hunt exceeds the number of available tags, the department may conduct a drawing for that zone or hunt.

Application Forms:

Except for permits and deer tags issued pursuant to sections 4181.5, 4188, and 4334 of the Fish and Game Code, application forms for deer tags (2004/2005 CALIFORNIA RESIDENT ONE-DEER TAG APPLICATION, LRB 1371A, rev. 4/2004; 2004/2005 CALIFORNIA NONRESIDENT ONE-DEER TAG APPLICATION, LRB 1371B, rev. 4/2004; 2004/2005 CALIFORNIA RESIDENT SECOND-DEER TAG APPLICATION, LRB 1371C, rev. 4/2004; 2004/2005 CALIFORNIA NONRESIDENT SECOND-DEER TAG APPLICATION, LRB 1371D, rev. 4/2004, incorporated by reference herein) shall be made available to the public at license agents and regular offices of the department.

Application Procedures:

Applicants must be at least 12 years of age and possess a California resident or nonresident hunting license valid for the deer hunting season for which they are applying, except applicants for additional junior deer hunts, who must possess a California junior hunting license.

No more than six persons may apply together as a party. To be considered as a party, all applications must be stapled together with the party leader's application on top and mailed in one envelope. All party members' applications must show the same tag choices in the same order of preference, the total number of persons in the party, and the party leader's name and identification number. All party members shall be awarded tags according to the choices listed on the party leader's application. Party applications for premium deer hunts shall not be split to meet the tag quota if the number of party members exceeds the number of available tags. Party applications which exceed the number of available tags shall be bypassed until the quota is reached. Incorrect or incomplete party applications will be separated and awarded tags on an individual basis.

Incomplete, incorrect, or ineligible applications will be rejected.

Application Fee: The department shall require that the specified fee for a deer tag be paid as a prerequisite to obtaining a deer tag application. In addition to the tag fee, the department shall also charge a nonrefundable $2.00 processing fee for each deer tag application.

Application Restrictions:

One-Deer Tag Application:
A person may use a one-deer tag application to apply for any premium deer hunt tag (X zone, additional hunt, or area-specific archery hunt) issued by drawing as specified in subsection 708 (a)(2)(A)1., above.

A person may use a one-deer tag application to apply for an A, B, C, or D zone tag or archery-only tag issued upon request.

A person may use a one-deer tag application to apply for any premium deer hunt tag (X zone, additional hunt, or area-specific archery hunt) remaining on the first business day after July 1. Applications must be submitted to the department's License and Revenue Branch in Sacramento, except applications for area-specific archery hunt A-22, which may be submitted in person to the department's Los Alamitos or San Diego offices.

Second-Deer Tag Application:
A person may use a second-deer tag application to apply for an A or B zone tag or archery-only tag issued upon request.

A person may use a second-deer tag application to apply for any area-specific archery tag remaining on the first business day following July 1. Applications must be submitted to the License and Revenue Branch in Sacramento, except applications for area-specific archery hunt A-22, which may be submitted in person to the department's Los Alamitos or San Diego offices.

A person may use a second-deer tag application to apply for any C or D zone tag or additional hunt tag, except an additional junior hunt tag, remaining on the first business day following August 1. Applications may be submitted before that date to the License and Revenue Branch in Sacramento.

A person in possession of a valid junior hunting license, who has not used a one-deer tag application to apply for an additional junior hunt, may use a second-deer tag application to apply for an additional junior hunt tag issued by drawing as specified in subsection 708 (a)(2)(A)1., and 708(g)(2)(A). A junior hunter may not submit more than one application for additional junior hunts.

No person shall submit more than one one-deer tag application and one second-deer tag application to the department during any one license year. Any person in violation of this subsection may be denied deer tags for the current and following license year.

Big Game Drawing System

General Conditions:
Except as otherwise provided, the department shall award license tags for premium deer (X zones, additional hunts, and Area-specific archery hunts), bighorn sheep, elk and pronghorn antelope hunts, as described in sections 360(b) and (c), 361, 362, 364 and 363, using a Modified-Preference Point drawing system.

Except as otherwise provided, the Modified-Preference Point drawing system shall award proportions of hunt tag quotas, as specified for each species, using the following drawing methods:

Preference Point Drawings. Tags are awarded based on the following order of priority: an applicant's hunt choice (first choice only for deer), accumulated point totals by species (highest to lowest), and computer-generated random number (lowest to highest).

Draw-By-Choice Drawings. Tags are awarded according to an applicant's hunt choice and computer-generated random number (lowest to highest), without consideration of accumulated points.

Except as otherwise provided, applicants unsuccessful in receiving a tag for premium deer (based on first choice selection), bighorn sheep, elk or pronghorn antelope hunts shall earn one (1) preference point for use in future Big Game Drawings.

To earn and accumulate a point for any species, a person must comply with all application requirements for that species as specified in subsections 708(a), (b), (c) and (d), including the following conditions:

Applicants must be at least 12 years of age at the time of application (16 years of age for bighorn sheep applications).

Applicants must possess a California hunting license valid for the hunting season requested (applicants for junior deer hunts must possess a junior hunting license). Applicants must provide evidence of such license at the time of application.

Applicants for elk and pronghorn antelope hunts must be California residents.

Applications for bighorn sheep, pronghorn antelope and elk hunts must include the appropriate nonrefundable processing fees.

Applications must be received by the department's License and Revenue Branch by 5:00 p.m. on the first business day after June 1.

Except for junior deer hunt applicants, applicants shall not submit more than one drawing application for each species during the same license year.

No applicant shall earn more than one (1) preference point per species, per drawing, for use in future drawings. Preference points are accumulated by species and shall not be transferred to another species or another person. Preference points are not zone or hunt specific.

Except as otherwise provided, successful applicants receiving tags for their first choice premium deer, bighorn sheep, elk or pronghorn antelope hunts shall lose all preference points for that species.

For party applications, the department shall use the average preference point value of all party members (total preference points for the party divided by number of party members) as the basis for consideration in the drawing for that species. Point averages shall not be rounded.

Except as otherwise provided, persons who do not wish to apply for an antelope, elk, bighorn sheep or premium deer tags may earn one (1) preference point for any or all of these species, by submitting the appropriate application(s), as specified in subsections 708 (a), (b), (c) and (d), and writing the point code number for that species, as defined by the department, in the hunt choice box (first choice only for deer). Persons applying for a preference point in this manner shall be subject to the same application requirements as regular drawing applicants as specified in subsection 708(g)(1)(D).

The department shall maintain records of preference points earned by individual applicants based on the hunter identification number provided on each application (driver's license number, Department of Motor Vehicles identification number, or hunter identification number assigned by the department). Applicants shall notify the

department's License and Revenue Branch, at 3211 S Street, Sacramento, CA 95816, in writing, of any changes or corrections regarding name, mailing address or hunter identification number.

Persons not applying for premium deer, bighorn sheep, elk, or pronghorn antelope hunts through the department's Big Game Drawings for five (5) consecutive years shall have their preference points for that species reduced to zero (0). For the purposes of this subsection, persons whose applications are disqualified from drawing shall be considered the same as persons not applying. Applying for preference points as described in (H) above, will keep an applicant's file active.

Premium Deer Hunts:

Except for junior deer hunt applicants, as specified in subsection 708(a)(2)(E), persons must use a one-deer tag application to apply for premium deer hunts through the department's Big Game Drawing.

License tags for premium deer hunts (except junior deer hunts) shall be awarded based on the following:

Ninety percent (90%) of the individual zone or hunt tag quota shall be awarded using a Preference Point drawing. Tag quota splits resulting in decimal fractions of a tag shall be rounded to the next higher whole number.

Ten percent (10%) of the individual zone or hunt tag quota shall be awarded using a Draw-By-Choice drawing. Tag quota splits resulting in decimal fractions of a tag shall be rounded to the next lower whole number.

For zones or hunts with quotas less than ten (10) tags, one (1) tag shall be awarded using a Draw-By-Choice drawing. Remaining tags shall be awarded using a Preference Point drawing.

Tags awarded to applicants for second or third choice zones or hunts shall be through a Draw-By-Choice drawing and shall not result in loss of accumulated points.

Junior Deer Hunts:

License tags for junior deer hunts (J Hunts) as described in subsection 360(c) shall be awarded based on the following:

Fifty percent (50%) of the hunt tag quota shall be awarded through a Preference Point drawing. Tag quota splits resulting in decimal fractions of a tag shall be rounded to the next higher whole number.

Fifty percent (50%) of the hunt tag quota shall be awarded through a Draw-By-Choice drawing. Tag quota splits resulting in decimal fractions of a tag shall be rounded to the next lower whole number.

A junior hunter applying for premium deer hunts (X zones, Area-specific archery hunts, and additional hunts) on a one-deer tag application and a second-deer tag application shall:

Receive a point only if he/she is unsuccessful in the big game drawing with his/her first choice on both applications.

Lose all preference points for deer if he/she receives his/her first choice on either application.

Deer Tag Exchange Fee: The department shall charge a nonrefundable $6.25 processing fee for exchanging a deer tag for a different zone or hunt.

Tagging Requirements: Immediately upon killing a deer, both portions of the deer license tag must be completely filled out and the date of kill permanently marked on the deer license tag. The deer license tag must be attached to the antlers of an antlered deer or to the ear of any other deer and kept attached during the open season and for 15 days thereafter. Except as otherwise provided, possession of any untagged deer shall be a violation (refer to Fish and Game Code, Section 4336).

Tag Validation and Countersigning Requirements, and Transporting for the Purpose of: Any person legally killing a deer in this state shall have the deer license tag validated and countersigned by a person authorized by the commission as described below in subsection 708 (a)(8) before transporting such deer, except for the purpose of taking the deer to the nearest person authorized to countersign the license tag, on the route being followed from the point where the deer was taken (refer to Fish and Game Code, Section 4341).

Deer Head Retention Requirements and Production Upon Demand: Any person taking any deer in this state shall retain in their possession during the open season thereon and for 15 days thereafter, that portion of the head which in adult males normally bears the antlers, and shall produce the designated portion of the head upon the demand of any officer authorized to enforce the provisions of this regulation (refer to Fish and Game Code, Section 4302).

Deer Tag Reporting Requirements: Every person to whom a deer tag is issued shall return the completed report card portion to the department within thirty days of taking a deer.

Deer Violations, Tag Forfeiture: Any person who is convicted of a violation involving deer shall forfeit their current year deer license tags and no new deer license tags may be issued to that person during the then current hunting license year, and that person may not apply for a deer tag for the following license year (refer to Fish and Game Code, Section 4340).

Deer and Elk Tags, Persons Authorized to Validate.
The following persons are authorized to validate or countersign deer and elk tags:
State:

Legislation and Fish and Game Code

In 1977, legislation (Assembly Bill 1521, Chapter 839) was introduced by Assemblyman Perino which became the backbone of modern deer management in California. The laws, sections 450 through 460, Fish and Game Code, specify the policy of the Legislature, define general deer hunting, provide direction to the Department about managing deer, specify the content of the annual report to the Legislature and direct the Department regarding hunting regulations.

Section 450 declares that it is the policy of the Legislature to encourage the conservation, restoration, maintenance and utilization of California's wild deer populations. Such conservation shall be in accordance with the principles of wildlife resources conservation set forth in Section 1801, Fish and Game Code, and in accordance with the objectives and elements stated in *A Plan for California Deer* (California Department of Fish and Game, 1976). Section 1801 is discussed in detail below in "Authorities and Responsibilities". The objectives stated in *A Plan for California Deer* are to restore and maintain healthy deer herds in the wild state and to provide for high-quality and diversified use of deer in California. The objective of the proposed project, therefore, is to implement the Plan's direction to provide high quality and diversified use of deer through public deer hunting.

Section 451 defines the "general deer hunting season" as the annual season for the area in question, as set by the Commission under its general regulatory powers, or as set by statute, for the taking of male deer.

Section 452 directs the Department to designate deer herd management units and a manager for each unit. The units are to be single deer herds or groups of deer herds having similar management and habitat requirements and characteristics. Boundaries of such units need not follow county boundary lines.

Sections 453 through 455 direct the Department to develop plans for deer herd management units. The objectives of such plans shall be the restoration and maintenance of healthy deer herds in the wild state and to provide for high-quality and diversified use of deer in California. The management plans are to contain programs to: obtain information needed about deer; maintain and increase the quality of deer habitat statewide, including the identification, maintenance and management of critical deer habitat; reduce natural mortalities; decrease the illegal taking of deer through modern law enforcement; and provide for both hunting and non-hunting uses of deer, consistent with the basic individual deer herd management unit capabilities. Specifically, the plans discuss the past history of each deer herd and document existing information for each herd. Current problems are listed, and solutions are identified as recommended actions in each of seven elements of deer management: (1) inventory and investigation; (2) habitat; (3) mortality; (4) utilization; (5) law enforcement; (6) communication of information; and (7) review and update. The plans are to be reviewed annually and shall be the basis for Department's recommendations to the Commission.

Section 456 directs the Department to produce a biennial report to the Legislature and to the Commission on the progress that is being made toward the restoration and maintenance of California's deer herds. Details of the content of the report are discussed in this Chapter under "Reports to the Legislature and Fish and Game Commission". Additionally, the Department shall not recommend to the Commission any deer management program or any modification of the Commission's deer hunting regulations unless they are consistent with deer herd management plans.

Sections 457 through 459 direct the Department to notify the Commission and specified county boards of supervisors of its intent to recommend the taking of antlerless and either-sex deer prior to the Commission's regulation-setting process. Boards of supervisors of 37 of the 58 counties have the authority to modify or veto any Department recommendations for harvesting antlerless and/or either-sex deer, based upon testimony presented at a hearing of the board and the submission of a resolution by the board to the Commission.

Section 460 requires the Department to notify the Commission prior to its regulation-setting process of deer herd units to be placed under a general season and whether any antlerless deer should be taken. If the Department believes that current hunter numbers would adversely affect the deer herd, impair the hunting experience or endanger the public safety, the Department shall also recommend restrictions on hunter numbers. The Department shall inform the Commission of the condition of each deer herd unit, and the Commission shall make the information known to the public.

In addition to sections 450 through 460, other State laws provide for management of wildlife, including deer, on private and military lands for control of depredation due to deer, increased access to the public, and protection and enhancement of habitats.

Sections 1570 through 1572 of the Fish and Game Code provide for cooperative hunting areas on private lands for the purposes of reducing trespass depredation, increasing public access and protecting deer habitats. Under this authority, the Commission established the Cooperative Deer Hunting Area Program, whereby qualifying landowners may apply for, and receive general season tags in deer quota zones where tags are distributed through drawing. The use of these tags is restricted to general season zone regulations and specifically to the landowners property within the zone.

Sections 3400 through 3408 of the Fish and Game Code provide for the management of fish and wildlife on private lands, and Section 3409 of the Fish and Game Code requires the Department to report every three years to the Speaker of the Assembly, the Chairman of the Senate Committee on Rules, and the chairmen of the policy committees of each house on the participants of the PLM Program, the wildlife management activities undertaken, the wildlife species managed and the harvest data.

Statutes similar to those for management of fish and wildlife on private lands are in sections 3450 through 3453 of the Fish and Game Code for management on military lands.

Section 4181.5 of the Fish and Game Code provides for the taking of deer by a landowner with property which is damaged or in immediate danger of being damaged. This Section directs the Department to issue a permit for taking depredating deer when evidence indicates that damage or the threat of damage has occurred. In lieu of these permits, with the consent of the landowner, the Commission may issue permits to licensed hunters to take deer to stop the damage or threatened damage to private property (Section 4188, Fish and Game Code).

Section 4334 of the Fish and Game Code provides authority for the Fish and Game Commission to direct the Department to authorize the sale of not more than ten fund-raising deer license tags. Since the 1996 deer hunting season, the Fish and Game Commission has directed the Department to authorize the sale of ten fund-raising deer license tags annually. These tags were offered for sale by nonprofit organizations selected by the Department through the Invitation For Bid process. Pursuant to Section 4334, all funds derived from the sale of these tags are continuously appropriated for use by the Deer Herd Management Plan Implementation Program. These funds will augment, not supplement, any other funds appropriated by the Department to implement this program.

Authorities and Responsibilities

The Legislature formulates the laws and policies regulating the management of fish and wildlife in California. The general wildlife conservation policy of the State is to encourage the conservation and maintenance of wildlife resources under the jurisdiction and influence of the State (Section 1801, Fish and Game Code). The policy includes several objectives, as follows:

a. To provide for the beneficial use and enjoyment of wildlife by all citizens of the State;

b. To perpetuate all species of wildlife for their intrinsic and ecological values, as well as for their direct benefits to man;

c. To provide for aesthetic, educational and non-appropriative use of the various wildlife species;

d. To maintain diversified recreational uses of wildlife, including the sport of hunting, as proper uses of certain designated species of wildlife, subject to regulations consistent with the maintenance of healthy, viable wildlife resources, the public safety and a quality outdoor experience;

e. To provide for economic contributions to the citizens of the State through the recognition that wildlife is a renewable resource of the land by which economic return can accrue to the citizens of the State, individually and collectively, through regulated management. Such management shall be consistent with the maintenance of healthy and thriving wildlife resources and the public ownership status of the wildlife resource;

f. To alleviate economic losses or public health and safety problems caused by wildlife; and

g. To maintain sufficient populations of all species of wildlife and the habitat necessary to achieve the above-stated objectives.

The Legislature has delegated authority to the Fish and Game Commission (Commission), whose members are appointed by the Governor, to regulate the take and possession of wildlife. Recent statutory changes require the Commission) to review the mammal hunting regulations pursuant to Section 207 of the Fish and Game Code at least once every three years. With respect to deer hunting regulations, 2004 is the first year of this three-year cycle. In the first year of this three-year cycle, the Commission, at a public meeting in February, receives recommendations for changes in these regulations from the Department, other agencies, and the general public. Based upon input received at the March and April meetings, the Commission may adopt mammal hunting regulations, including those for deer. During the second and third years of the above described three-year cycle, the Commission receives proposals from the Department for changes in the mammal hunting regulations of an urgent nature, for the good of the resource, for clarity or where take quotas are based on population performance.

When adopting regulations, the Commission considers populations, habitat, food supplies, the welfare of individual animals and other pertinent facts and testimony (Section 203.1, Fish and Game Code). In particular, the Department and Commission seek to conserve endangered and threatened species (Section 2055, Fish and Game Code).

The Commission has the authority to adopt emergency regulations if it is necessary for the immediate conservation, preservation or protection of birds, mammals, reptiles or fish or for the immediate preservation of the public peace, health and safety, or general welfare (Section 240, Fish and Game Code).

Reports to the Legislature and Fish and Game Commission

Section 456 directs the Department to produce a biennial report to the Legislature and to the Commission on the progress that is being made toward the restoration and maintenance of California's deer herds. The report includes a review of program activities regarding deer habitat, particularly addressing problems dealing with identification and preservation of critical deer habitat areas; the amount of revenue derived from the sale of deer tags during the two previous fiscal years; a list of expenditures during the two previous fiscal years and proposed expenditures during the current fiscal year; and a report of general benefits accrued to the deer resource as a result of the program.

In addition, Section 3409 of the Fish and Game Code requires the Department to report every three years to the Speaker of the Assembly, the Chairman of the Senate Committee on Rules, and the chairmen of the policy committees of each house on the participants of the PLM Program, the wildlife management activities undertaken, the wildlife species managed and the harvest data.

DEER HERD MANAGEMENT PLANNING

The deer herds of California were first described by Longhurst *et al.* (1952). Those authors described a total of 111 distinct deer herds, based on a general survey of the deer ranges of the State. The amount of information available concerning deer herds has expanded greatly over the years, necessitating the revision of the herd descriptions. Currently, deer herds in California are described in 80 deer herd management plans. Some of these herds are the same as those described by Longhurst *et al.* (1952), but others have been combined or redefined to reflect current biological conditions.

The herds, as currently described, are intended to be biological units, composed of more or less reproductively isolated populations of deer. In the case of migratory deer, there are often natural biological/geographical units upon which to base herd boundaries. However, nonmigratory population boundaries are often based upon political boundaries, as the animals are dispersed throughout the range during the entire year. Also, administrative divisions of the Department (regions) play a role.

Unit or district wildlife biologists assigned to a county or counties are responsible for all the wildlife in their area. Some units contain one or more discrete deer herds, while others share herds with adjoining units. This arrangement is consistent with the deer management policy for the State of California (Section 450, Fish and Game Code), which states:

> "It is hereby declared to be the policy of the Legislature to encourage the conservation, restoration, maintenance, and utilization of California's wild deer populations. Such conservation shall be in accordance with the principles of wildlife resources set forth in Section 1801 and in accordance with the objectives and elements stated in *A Plan for California Deer*, 1976."

In response to this policy, the Department developed plans for each deer herd management unit. The objectives of these plans are to restore and maintain healthy deer herds in the wild state and to provide for high-quality and diversified use of deer in California (Section 453, Fish and Game Code). These management plans contain programs to: obtain information needed about deer; maintain and increase the quality of deer habitat statewide, including the identification, maintenance and management of critical deer habitat; reduce natural mortalities; decrease the illegal taking of deer through modern law enforcement; and provide for both hunting and non-hunting uses of deer, consistent with the basic individual deer herd management unit capabilities. Specifically, the plans discuss past history and document existing information for each herd. In addition, current problems are listed, and solutions are identified as recommended actions in each of seven elements of deer management. The seven elements are: (1) inventory and investigation; (2) habitat; (3) mortality; (4) utilization; (5) law enforcement; (6) communication of information; and (7) review and update. The plans are reviewed annually and are the basis for Department recommendations to the Commission (Section 456, Fish and Game Code). Finally, the Department reports biennially to the Legislature on the status of the deer management program. The report describes the

status of deer and the progress made toward implementing the deer herd management plans.

Historically, management of most deer populations in the United States was conducted on an ad hoc basis. Therefore, management decisions were made to reflect yearly observed conditions. However, this was done in the absence of a long-term planning horizon or explicit objectives. More recently, California and other states have begun to manage deer on a herd basis, with written plans containing a planning horizon (generally of substantial length) and explicitly stated management objectives. Such a program has been underway in California since 1976, beginning with the formulation of *A Plan for California Deer* (California Department of Fish and Game 1976). The initial phase of that effort is now complete, and there are published, strategic plans for all deer herds in the State. Management planning, however, is not a static process, thus plans are updated annually, or as needed, to reflect current environmental and biological conditions.

The Department is statutorily responsible for management of deer. However, in most cases it has no direct authority over the management of their habitats. For this reason, management planning is coordinated with various land management agencies. These include: the U.S. Forest Service (USFS), Bureau of Land Management (BLM), National Park Service (NPS), State Parks, the California Department of Forestry and Fire Protection, the Military and interested publics.

The planning process can be divided into three discreet phases: information gathering, goal setting, and recommendations to achieve those goals. All of the information relevant to a herd is collected on an ongoing basis and summarized to establish realistic herd objectives. Once basic data were compiled, goals were established. To establish these goals, each unit manager met with his/her counterparts in the agencies responsible for managing the herd's habitat to consider possible changes in the habitat over the planning horizon and how those changes would affect the herd. The factors considered included the amount of habitat available, habitat quality, management of other resources within the herd range, changes in mortality, etc.

A program of specific management objectives was developed based on feasible goals, considering biological, social and political opportunities. Once complete, each agency involved in the process approved the plan. On December 1, 1985, the Commission approved the deer herd management plans.

In 1984, the Legislature established the Deer Herd Management Plan Implementation Program (DHMPIP). Pursuant to Fish and Game Code, Section 4332, funding is provided from deer tag sales to implement the State's deer herd management plans. Deer management projects recommended by the plans are eligible for funding (implementation) under this program. Each region has a DHMPIP coordinator who is responsible for assisting in the organization and funding of projects.

Applications for project funding are made through regional Department offices. However, the process is initiated by the unit manager, who consults the plan for the herd in question and prioritizes the needed actions. When appropriate, priorities are discussed with personnel from other land managing agencies. Initial prioritization of projects is done at the annual meetings with biologists from the other agencies. When funding has been approved for a project, contracts are developed if the work is to be done by outside agencies or individuals. Once written and signed by a Department Contract Manager in Sacramento, the project is initiated.

Population Objectives

Deer population objectives are specified in each of the deer herd management plans. These generally include a buck ratio, population size, and harvest level. These objectives were established as long-term targets. However, these objectives will be re-evaluated in the context of likely future conditions in California. Currently, the Department is satisfied that these objectives are effective and appropriate for the management of the State's deer herds.

One of the population objectives, buck ratios, has been established for each deer herd management unit. These objectives were determined through an integrated review process where public preference and biological capability were used to formulate objectives for each herd unit. Buck ratios are measures of the proportion of bucks in the population relative to the number of does. When considered alone, they are not an indicator of population size. Additional information about harvest or other mortality is needed to estimate the number of deer in a particular population. However, buck ratio information is valuable biological information necessary to assess whether or not sufficient bucks are available to breed all reproductively active does. So long as a minimum proportion of bucks remain in the population, bucks-only harvest generally has no significant impact to the population dynamics of deer because it does not impact potential fawn recruitment.

Buck ratios are used extensively for harvest management of deer in California because the main hunting strategy in the State is for bucks-only. Because predominantly bucks are hunted, a buck ratio serves to measure the relative impact of hunting on the male segment of the herd. There is no "ideal" buck ratio. However, it is desirable to maintain sufficient numbers of male deer in the population to breed all receptive does each year. The deer herd management plans for the State have set buck ratio objectives. These values are reported in Table 1-1. As long as the buck ratios observed in the populations exceed the biologically significant level (three bucks per 100 does), no biologically adverse impact to the herd is expected. Herd plans specify a buck ratio objective to ensure adequate herd quality for both consumptive and non-consumptive uses, as directed by Section 453, Fish and Game Code. Thus, buck ratios are good indicators of the relative impact of buck hunting on the buck segment of the population. However, these ratios do not indicate total population trends, as harvesting only the male segment of the herd does not affect total numbers due to annual recruitment.

Prior to the establishment of the current deer hunting zones and quota system, buck ratios in portions of northeastern California were as low as three bucks per 100 does. An analysis of female fetal rates observed in these deer were similar to fetal rates of does in herds with buck ratios exceeding 40 bucks per 100 does. Therefore, pregnancy rates in female deer were not negatively affected by buck ratios as low as three bucks per 100 does.

The low buck ratios observed in some herds in the 1970s were not considered desirable by segments of the hunting and non-hunting public, as well as the Department. It is the policy of the Legislature to encourage the conservation, restoration, maintenance and utilization of California's wild deer populations (Section 450, Fish and Game Code). In response to this policy, the Department developed deer herd management plans with buck ratio objectives for deer herd units statewide. Buck ratios were set at levels which would: (1) not negatively affect reproduction, and (2) provide for a reasonable number of mature bucks in the population for hunting and viewing by the public.

Current buck ratio objectives stated in the deer herd management plans range from 45 bucks per 100 does to accommodate NPS management objectives to 12 bucks per 100 does for a herd which is hunted in both Oregon and California.

Population objectives for individual herds are specified in the specific deer herd management plans. These objectives are idealized targets that can only be achieved under conditions that in most cases do not currently exist. Deer population size is substantially contingent upon the quality and quantity of habitat (Mackie, et al. 1998). Management of deer populations requires consideration of the ecological context, the socioeconomic concerns, the population dynamics, and the biological constraints of each herd or group of herds.

Dissemination of Information

Sections 450 through 460, Fish and Game Code, describe the Legislature's policy regarding deer management and mandate that programs be in accordance with the objectives specified in *A Plan for California Deer*. An element of the Plan specifically relates to the dissemination of information to keep various publics informed of the status of deer and to help facilitate appropriate management of deer on a herd-by-herd basis.

The Department currently publishes an annual newsletter (*TRACKS*), which is designed to provide information about deer management in California to hunters and other interested publics. *TRACKS* serves as a mechanism to inform the public regarding issues such as critical deer habitat needs, progressive harvest strategies and anticipated regulation changes related to deer.

Every year a summer edition of *TRACKS* is published, which addresses issues such as: habitat preservation and restoration, the DHMPIP, wildlife protection, effects of wildfire on deer, deer diseases, harvest information and herd composition data. In past years, newsletter subscriptions ranged from about 7,000-10,000. Currently, *TRACKS* is available

over-the-counter at Department offices, license agents, through direct mailing to approximately 60,000 hunters annually, and on the Department's webpage.

In addition to this newsletter, the Department provides deer information through an extensive public information program. Biweekly news releases provide the public with current information on deer seasons, the regulation process, habitat concerns, etc. The Department also maintains an internet web site at www.dfg.ca.gov with additional information specific to deer and deer hunting on the Deer Management Program's webpage at www.dfg.ca.gov/hunting/deer/index.htm.

DEER RANGE ADMINISTRATION

In addition to deer life history work, investigations and resulting biological/ecological findings and conclusions that will be discussed in Chapter 3, there are operational documents, policies, and laws that relate to deer ranges in the state. These policies and laws appear to interchangeably use both the terms critical and key in discussing deer range. As a start, the Commission adopted a Deer Management Policy in 1950 that still exists today. Dasmann (1953) provided an analysis of the policy, concluding in part: "The lands on which deer occur in California may be zoned in accordance with the areas and values which predominate: Zone A- Public lands with deer priority, such as critical winter areas, where intensive habitat improvement may be justified. Zone B- Public lands where deer must fit in with other uses" (note: the zone A,B designation described by Dasmann does not appear to have been adopted). Additional policy in California's Deer Management Handbook (1957 version) provided instructions for deer range surveys: "...surveys will ordinarily be confined to the more important range areas, such as key winter areas, summer concentration areas, or other portions that may serve as indicators of general range use and deer population levels."

The landmark California Fish and Wildlife Plan (1966) was written to identify "...actions which must be taken to maintain or improve California's wildlife resources..." The plan discussed deer habitat improvement stating: "Deer habitat improvement is usually aimed at providing more available nutritious browse during the critical time of the year... (in the) South Coast... (the) critical period is usually during the summer... (the) critical period on most migratory ranges is in the winter, although shortage of summer range forage is becoming more common on migratory ranges." The plan did not specifically distinguish deer ranges in terms of quality or importance.

The California Legislature, in setting the direction for the management of deer adopted "A Plan for California Deer, 1976" and placed in law that individual deer herd plans shall "...develop programs to maintain and increase the quality of deer habitat statewide...Emphasis shall be directed towards identifying critical deer habitat areas and the maintenance and management of such areas..." (Fish and Game Code section 450-460). The legislation however, was silent on whether these areas were already in critically poor condition. The 1976 plan described some of the "...human impact on deer..." such as "...key winter range areas were inundated by the new lake..." indicating that evaluations of deer range had been accomplished to some level.

In the early 1980s, the Commission and Department followed up the 1976 plan with a policy to identify deer herd management units and develop management plans for each of the herds. This was the initiation of the 80 deer herd plans around the state. The Commission policy for this effort stated: "The goals of such plans shall be the restoration and maintenance of critical deer habitats to perpetuate healthy deer herds in the wild state as set forth in the appropriate deer herd management plans." This policy reaffirmed CDFG (1947) that critical winter ranges included areas in critical (poor) condition as deer habitat. These were considered areas where intensive improvement may be justified. Other lands "...with deer priority..." could be included as well, however, it was unspecified what these other lands were intended to be although it seems reasonable to assume it meant other important deer habitats, on winter or summer range.

Proposition 70, The Wildlife and Natural Areas Conservation Act passed in 1988, appropriated $6,000,000 for "critical habitat areas" including "winter deer ranges" confirming that winter deer ranges are considered critical habitats. Two years later, in 1990, California voters passed the California Wildlife Protection Act of 1990 (this was the controversial Proposition 117 which elevated mountain lions to protected status). Now in Fish and Game Code, section 2780 of the act states: "Much of the state's most important deer winter ranges have been destroyed in the last 20 years...Critical winter ranges of migratory deer in the Sierra Nevada and Cascade mountain ranges are increasingly subject to incompatible land uses. In some counties, over 80 percent of the critical winter ranges fall on these lands. The potential for incompatible land uses on these lands is a major threat to the survival of many migratory deer herds...This chapter shall be implemented in the most expeditious manner. All state officials shall implement this chapter to the fullest extent of their authority in order to preserve, maintain, and enhance California's diverse wildlife heritage and the habitats upon which it depends."

These most recent declarations by the people of California (statewide ballot propositions 70 and 117) indicate deer winter ranges are considered critical up and down the Sierra Nevada and elsewhere, and interestingly, require all State officials, not just Department officials, to preserve, maintain, and enhance them.

CURRENT HUNTING STRATEGY

DEER HUNTING ZONES, AREA-SPECIFIC ARCHERY, AND ADDITIONAL HUNTS

In California, deer are managed on a unit basis (Section 452, Fish and Game Code). These units may consist of an individual herd or group of herds having similar ecological and management requirements. Currently, deer hunting occurs within specific units (zones) or areas within those units (area-specific archery hunts, additional hunts, and PLMs).

In 2003, deer hunting was authorized by the Commission within 44 zones, 27 area-specific archery hunts, 38 additional hunts, 59 PLMs and 10 fund-raising license tags. The permits or deer license tags authorized for deer hunting zones, area-specific archery hunts,

additional hunts, PLM, and fund-raising tags are valid only for specified areas and periods. In this way, the deer harvest can be regulated to maintain the Department's objectives for herds within specific areas of the State.

Quotas were first used to regulate hunter harvest of deer in 1978 during what were called "Exceptional Opportunity Hunts". Prior to that time, hunter numbers were essentially unrestricted. Since 1978, tag quotas for most zones and all additional hunts have been established. Harvest is also regulated by adjusting the method of take, timing or length of the hunting season, and/or the type of deer (buck, doe or both) allowed taken.

In the majority of deer zones in California, deer may be taken during either archery or general seasons. Archery deer seasons precede the general seasons, and deer may only be taken with archery equipment, as specified in Section 354, Title 14, CCR. During general seasons, deer may be harvested using a variety of methods, including centerfire rifles, muzzleloading rifles, shotguns, pistols, crossbows and archery equipment, as described in Section 353, Title 14, CCR. Based on hunter success, rifles are the most effective method of taking deer, and archery equipment is the least effective. Therefore, under similar conditions, fewer rifle tags would be authorized than archery tags for an area to maintain herd objectives.

Hunting season length may be adjusted to obtain herd objectives and provide hunting opportunity for the public. In some deer zones, hunter take is positively correlated with season length (the longer the season, the greater the harvest). However, the timing of the season is also an important factor. The breeding season (rut) for deer in California extends from late September through February. In general, the rut occurs earlier in southern portions of the State and later in northern areas. Buck deer, in particular, are more vulnerable during the rut than at other times of the year. To achieve harvest goals, fewer tags are issued for hunts which coincide with the breeding season versus the non-breeding season in an area. In each zone, area-specific archery hunts, additional hunts, PLMs, and fund-raising hunts where buck deer are taken, the harvest is restricted to male deer bearing a branched antler on either side, with the branch in the upper two-thirds of the antler (forked horn) (Section 351, Title 14, CCR). Spike bucks (male deer with un-branched antlers on both sides which are more than three inches in length) may not be taken at any time and have been protected by State law since 1919 (Section 204, Fish and Game Code).

Opportunities for the public to harvest buck deer, antlerless deer and deer of either sex are offered in the form of additional, area-specific archery, PLM, and fund-raising hunts. Limited numbers of tags are offered for these hunts, and hunter success is generally above the statewide average of about 17 percent. Several of these hunts are specifically designed to provide hunting opportunities for archery and muzzleloading enthusiasts.

In all zones, hunters possessing tags are permitted to take one buck deer, forked horn or better, per tag per season.

COOPERATIVE DEER HUNTING (SECTION 554) AREA PROGRAM

In addition to deer hunting opportunities offered to the general public through zones, area-specific archery hunts, and additional hunts, the Commission authorizes some restricted sport hunting of deer to qualifying landowners in those zones where tag quotas are filled through drawing (X zones).

The Cooperative Hunting Areas Program was established by the Legislature (Sections 1570-1572, Fish and Game Code) to encourage the protection and enhancement of deer habitats, provide additional protection to landholders from trespass depredation, and increase access to the public for deer hunting opportunities on privately controlled lands. Specifically, Section 554, Title 14, CCR, contains regulations adopted by the Commission which authorize the Cooperative Deer Hunting Area Program, or "Section 554 Program".

To apply for area permits and deer tags under the Section 554 Program, individuals must submit a completed application and One Deer Tag Application for the appropriate deer zone to the Department regional office of responsibility. In order to participate within the Section 554 Program, the following requirements and restrictions apply:

a. The area under consideration must be private land under the control of one or more owners, at least 640 acres in size, within, or adjacent to, 5,000 acres of critical deer habitat in deer quota zones (see Section 360) which require public drawing for the distribution of deer tags (see Section 708).
b. Applicants must be the owner(s) of the property under consideration for permit.
c. No individual may submit more than one Section 554 application or deer tag application per deer season.
d. No more than two individuals may apply for a given parcel of land.
e. Incomplete applications will be rejected and returned to the applicant within 15 days of receipt by the Department.
f. Section 554 deer tags are valid only during the season for the deer zone specified.
g. Section 554 deer tags may only be used on the private lands specified in the landowner's application for permit.
h. All provisions of the Fish and Game Code and Title 14, CCR relating to the take of birds and mammals shall be a condition of all permits and tags issued pursuant to the Section 554 Program.

In 2003, a total of 155 tags were issued through the Section 554 Program to landowner participants in the X zones. The number of tags authorized for Section 554 is minimal compared to the number of tags issued in the X zones. In 2003, the number of Section 554 tags issued to take deer within the X zones was approximately 1.8% of the total number of X zone tags authorized. In addition, only about 1.8% of the deer legally harvested in the X zones were taken on Section 554 areas (32 bucks). Deer harvest from the Section 554 Program is included in the Department's analysis of the effects of the proposed project and various alternatives in chapters 4 and 5.

PRIVATE LANDS WILDLIFE HABITAT ENHANCEMENT AND MANAGEMENT (PLM) AREA PROGRAM

In addition to deer hunting opportunities offered to the public through zones, area-specific archery hunts, and additional hunts, the Commission authorizes sport hunting of deer on PLM Program properties.

The PLM Program, commonly called "Ranching For Wildlife," was authorized by the Legislature (Sections 3400-3409, Fish and Game Code) to protect and improve wildlife habitat by encouraging private landowners to manage their property to benefit fish and wildlife. Economic incentives are provided to landowners through biologically sound, yet flexible, seasons for game species resulting in high quality hunting opportunities which may be marketed by the landowner in the form of fee hunting or other forms of recreation. Section 601, Title 14, CCR, contains regulations adopted by the Commission pertaining to the PLM Program, and sections 3400-3409 of the Fish and Game Code contain the subject statutes.

In 2003, there were a total of 75 PLMs (59 authorized deer hunting) licensed in the program, representing wildlife management and habitat protection on approximately 857,390 acres of privately owned land. In comparison, the Department also administers approximately 750,000 acres statewide. The number of tags authorized for deer in PLM areas is minimal compared to the number of deer tags sold statewide. In 2003, less than one percent of the total number of tags issued to take deer in the State was designated for use on PLMs. In addition, only 2.2 percent of the total deer legally harvested in the State were taken on PLMs (474 bucks and 166 does in 2003). Harvest from the PLM Program is included in the Department's analysis of the effects of the proposed project and various alternatives in chapters 4 and 5.

PLM Deer Hunting Procedures

Landowners have always had the right to charge access fees for hunting, fishing, and other recreation on their property. The PLM Program allows the Commission to further authorize tags and hunting seasons specific to licensed PLM areas, that are consistent with goals and objectives of the Department's approved deer herd management plans. Deer hunting on these areas requires a special PLM deer tag specific to each area. A person who wishes to hunt on a PLM area must exchange a valid, unused deer tag or deer tag application to receive a PLM area tag. Once issued, a PLM area tag hunter may hunt that particular area or another PLM area, if the PLM tag has been properly exchanged. Deer hunters are still restricted to taking no more than two deer in the State with no more than one buck deer taken in an X Zone.

Application and Licensing Procedures

The Department carefully screens new applicants to determine potential for significant habitat improvements on the proposed PLM areas. To become licensed, the landowner submits an application package, including a comprehensive management plan containing, among other things, habitat enhancement goals and objectives. Additionally, the potential

licensee pays a nonrefundable processing fee which is designed to meet all program costs. Department staff reviews the application and management plan to ensure that proposed habitat enhancements will benefit wildlife and that proposed harvest strategies comply with the goals and objectives stated in the Department's management plans for the game species involved. After Department regional approval, the management plan and license application undergo further review at the headquarters level, prior to being submitted to the Commission for final approval. Once approved by the Commission, a PLM license is valid for five (5) years. However, each license is subject to annual review by the Commission.

The annual review process requires a landowner to submit a renewal application package which includes a report of habitat management activities completed on the area during the previous year, proposed habitat projects for the coming year, the numbers of animals harvested, and the proposed harvest for the next hunting season. In addition, Department staff conduct annual inspections on each PLM area to determine compliance with regulations and completion of required habitat improvements outlined in the management plan and annual report. The renewal application package, including a compliance inspection report, is then reviewed by Department staff and submitted to the Commission for final approval.

Deer Harvest on PLMs

Tag allocations and harvest data (antler class) were compiled for PLMs and public zones where PLM areas exist in California. Table 2-1 provides a comparison between public and PLM area buck tag authorization and harvest. From 1997 through 2003, a total of 764,623 buck deer tags were sold to the public in zones where PLMs exist, for deer hunting. In comparison, over the same seven-year period, 7,331 PLM buck deer tags were sold (including either-sex deer tags). During this period, buck deer tag authorization for PLMs was less than one percent of the total deer tags sold to the public in zones where PLMs exist.

The hunter success rate differed substantially between the public areas and PLMs during this same time period. Estimated hunter success for public hunters, in zones where PLMs exist, in 2003 was approximately 16 percent, while approximately 50 percent of hunters on PLMs were successful. This result is not surprising, as hunting on PLM areas is provided to a limited number of hunters to take a specified number of deer. These conditions, together with the flexible seasons provided to the licensed area, facilitate a higher success rate. Recently, comments have been made that late season hunting (hunting during the breeding season) on PLM areas undermines the genetic integrity of the deer population. The evaluation and analysis of these concerns are provided in the "Effects of Hunting on Genetics of California Deer" in Chapter 4. Many PLM areas do not hunt in an extended season and the late season hunting that does occur on PLM areas, as well as late season public hunts, are strictly controlled by quota. In addition, buck harvest from these late season PLM hunts accounts for less than one percent of the total deer harvest in the State. Harvest at this low level has not been shown to have any measurable effects on a population's genetic integrity anywhere mule deer are hunted. Characteristics such as antler

and body size are primarily related to habitat conditions and the lack of aggressive antlerless harvest, which reduce competition (Longhurst *et al.* 1952, McCullough 1979).

Table 2-1. Buck Tag Authorization and Harvest on Private Lands Wildlife Habitat Enhancement and Management (PLM) Areas and Public Deer Hunting Zones Where PLMs Exist (1997 through 2003)

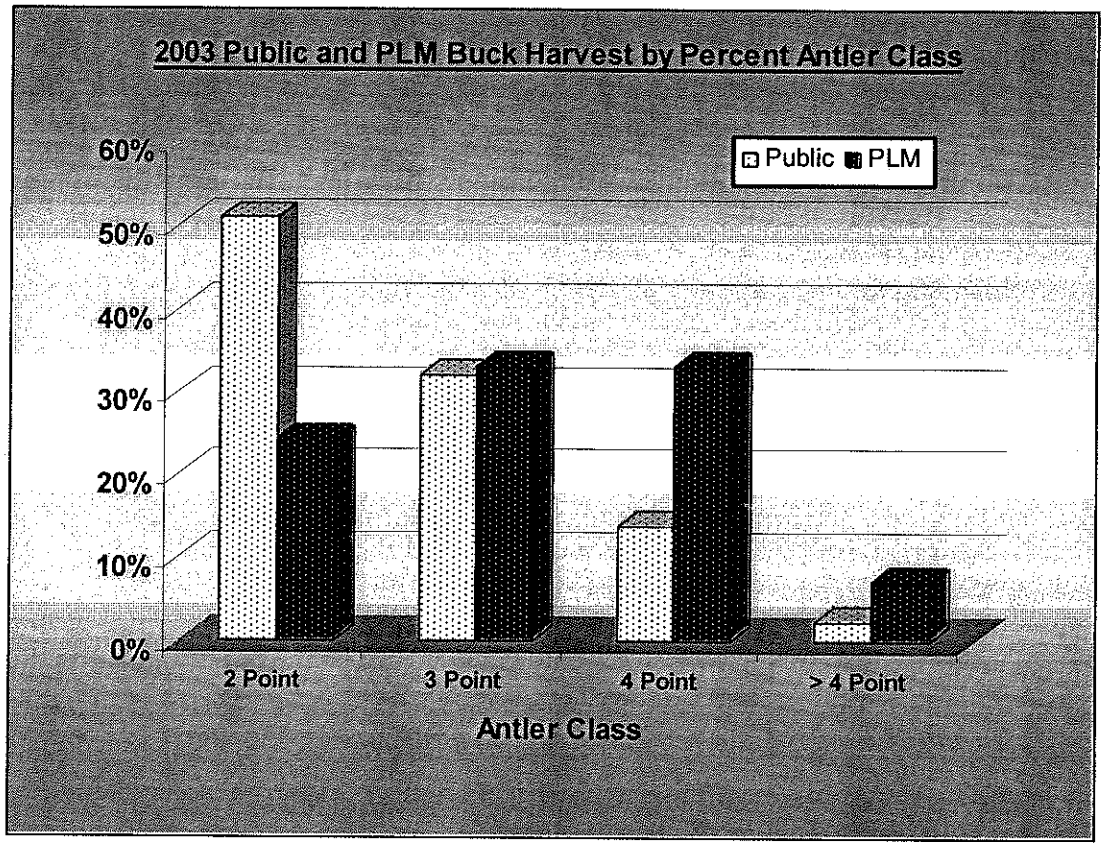
Year		Buck Tags Authorized	Buck Tags Sold	Buck Harvest[a]	Hunter Success (%)
1997[b]	Public	150,443	113,201	31,700	28
	PLM	808	808	420	53
1998[b]	Public	150,965	108,151	25,237	23
	PLM	859	859	479	56
1999[c]	Public	115,265	112,598	24,433	22
	PLM	1,179	1,179[d]	580[d]	49
2000[e]	Public	75,505	46,118	14,266	30.9
	PLM	1,011	1,011[d]	555[d]	54.8
2001[f]	Public	134,369	130,319	23,050	17.7
	PLM	960	960[d]	402[d]	41.9
2002[g]	Public	133,737	129,780	20,408	15.7
	PLM	1,226	1,226[d]	442[d]	36.1
2003[h]	Public	174,115	124,456	20,249	16.3
	PLM	1,288	1,288[d]	638[d]	49.5

a *Buck harvest for public deer hunting zones is an estimate derived from individual zone correction factors and zone reported kill. PLM buck harvest is actual and derived directly from harvest reports.*
b *Deer zones analyzed in 1997 and 1998 include A, B, C, D-3, D-10, X-1, X-3a, X-3b, X-4, X-5a, X-5b, and X-6a.*
c *Deer zones analyzed in 1999 include A, B, C, D-3, D-10, D-14, D-15, X-1, X-3a, X-3b, X-4, X-5a, X-5b, and X-6a.*
d *PLM buck harvest and tags sold include either-sex tags.*
e *Deer zones analyzed in 2000 include A, D-3, D-10, D-14, D-15, X-1, X-3A, X-3B, X-4, X-5A, and X-6A.*
f *Deer zones analyzed in 2001 include A, B, C, D-3, D-10, D-14, X-1, X-3a, X-3b, X-4, X-5a, X-5b, and X-6a.*
g *Deer zones analyzed in 2002 include A, B, C, D-3, D-10, D-14, D-15, X-1, X-3a, X-3b, X-4, X-5a,and X-5b.*
h *Deer zones analyzed in 2003 include A, B, C, D-3, D-10, D-14, D-15, X-1, X-2, X-3a, X-3b, X-4, X-5a,and X-5b.*

Segments of the public believe that excessive numbers of large-antlered deer are taken each year on PLMs. Figure 2-1 shows the comparison of 2003 harvest by antler class between PLM and public deer hunting zones. An analysis of harvest report cards submitted by successful hunters reveals a similar harvest pattern. In 2003, two-and three-point bucks comprised approximately 83.1 percent of the public harvest while four-point or better bucks made up only 16.3 percent. During the same period, the PLM harvest consisted of approximately 57.2 percent two- and three-point bucks and 40.1 percent four-point or better

bucks. In 2003, 2,476 four-point or better bucks were harvested by public hunters, while only 119 deer in this antler class were harvested by PLM hunters. It is apparent from these data the PLM harvest is extremely small in comparison to the public harvest (Table 2-1).

Figure 2-1. Antler Class of Public and PLM Buck Harvest



Harvest from both the PLM Program and late season public hunts are included in the Department's analysis of the effects of harvest on the project areas.

Habitat Modification

The PLM Program has been successful as an effective incentive for landowners to protect or improve wildlife habitat. Habitat improvements implemented under approved management plans on licensed areas include: controlled burns to improve forage conditions for browsing species, reduced or deferred livestock grazing to lessen competition with wildlife, protection of wildlife fawning/nesting sites and riparian areas, development of wetland/marsh areas,

construction of brush piles as escape cover for small mammals and birds, water source improvement, and planting of forage or cover crops exclusively for wildlife use, fencing modifications to allow easier passage by big game species, and modifications to hay cutting equipment to reduce losses of nesting waterfowl and upland game bird species. These projects also benefit a wide variety of non-game, threatened, or endangered species as well. For example, habitat improvements such as riparian development and enhancement directed toward improving fawning cover for deer benefits hundreds (approximately 331 species in hardwood-dominated habitats) of non-game wildlife species. In 2003, approved management plans directed habitat enhancements designed specifically to improve conditions for seven endangered or listed species.

Review of potential results of habitat improvement projects occurs at many levels throughout the planning and implementation of the projects. Department staff reviews proposed habitat improvement projects during the management plan review process prior to license approval. The Commission also reviews all management plans prior to final approval. Many of the larger improvements which have the potential for significant environmental modification, such as controlled burns designed to benefit early successional stage wildlife species, are often accomplished under one of several State or Federal cost-sharing assistance programs. Virtually all of these programs utilize environmental checklists to ensure adequate environmental review of a proposed project.

FUND-RAISING LICENSE TAGS

In 1994, the Legislature authorized the Fish and Game Commission to annually direct the Department to authorize the sale of up to ten fund-raising deer license tags (Section 4334, Fish and Game Code). No fund-raising deer license tags were authorized for 1995. Ten fund-raising deer license tags (see Chapter 1) have been authorized for sale annually from 1996 through 2003. Funds generated by this program will be used to benefit deer research and management activities statewide.

CHAPTER 3. ENVIRONMENTAL SETTING OF THE PROJECT

The proposed project occurs on public and private wildlands open to hunting throughout the State. Excluded are those areas where firearms restrictions or access restrictions are in place. These include, but are not limited to: urban areas, parks/preserves, game refuges, and most military installations (there are some military lands where deer hunting is allowed). However, the entire State is divided into deer hunt zones and hunters must make sure that hunting is a legal activity and that they have a legal right to hunt on any parcel of land that they plan to hunt.

The project will result in up to several thousand people throughout the State to be "in the field" at the same time, at varying densities, depending on hunt zone. Hunting activity occurs during daylight hours and typically in remote settings. Hunters may camp out, stay in motels/hotels, or return home from a days hunting.

DEER IN CALIFORNIA

California's mule and black-tailed deer are among our most visible and widespread wildlife species, inhabiting much of the wildlands in the State (Figure 3-1). Consequently, their value as representatives of California's wildlife resources is high. Deer are enjoyed for viewing as in the mountain meadows of Yosemite National Park, along 17-mile drive on the Monterey Peninsula, or concentrated on winter range on the east side of the Sierra Nevada and Cascade ranges. Deer are an integral component in the food chain, from their role as grazers/browsers of wildland plants to their role as prey species to California's top carnivores particularly the mountain lion, black bear, coyote, and golden eagle.

Deer inhabit approximately 64 million acres (64 percent) of the State (Longhurst *et al.* 1952, Departmental data) at varying densities (number of deer per square mile) depending on the quality of the range (McLean 1940). The native deer species are mule deer (*Odocoileus hemionus*) in the family Cervidae (e.g., deer, moose, elk and caribou) and the order ARTIODACTYLA, or even-toed ungulates. The deer family is separate from other ungulates in that they have antlers and certain dermal glands.

There are six subspecies of mule deer recognized in California:

Rocky Mountain mule deer	(*Odocoileus hemionus hemionus*)
Inyo mule deer	(*Odocoileus hemionus inyoensis*)
California mule deer	(*Odocoileus hemionus californicus*)
Burro deer	(*Odocoileus hemionus eremicus*)
Southern mule deer	(*Odocoileus hemionus fuliginatus*)
Columbian black-tailed deer	(*Odocoileus hemionus columbianus*)

"...drives these deer into a section of country about five or six miles wide and about thirty miles in length." Hall (1927) indicated "In most parts of California the mule deer have separate summer and winter ranges. In spring, as the snow melts, the deer work up into the mountains... with the first heavy snowfall they migrate down to their winter range..."

Deer populations inhabiting ranges subject to abundant winter snow are not the only one's to exhibit seasonal movements. McLean (1930) and Longhurst and Chattin (1941) mentioned that the burro deer in the Colorado River area of California is found nearer the river during the dry seasons than during the rainy seasons when they may be as far as 97 km (60 mi) away in mountain ranges. Taber and Dasmann (1958), in a comprehensive report on the black-tailed deer of California's north coast chaparral, describe seasonal movements of approximately a mile by deer to take advantage of warm, south aspects during winter; and cooler, north aspects during summer.

As part of implementing deer herd management plans, the Department has conducted radio telemetry studies of varying intensity and duration on nearly all migratory deer ranges in the state. These have resulted in largely unpublished internal reports that describe winter, transitional, and summer ranges, as well as general migration routes. Results of many of these studies have been compiled and exist as individual data layers in a GIS, however, a comprehensive statewide coverage has not been completed.

Relative Importance of Seasonal Ranges

As knowledge about deer movements increased, it became evident to investigators that not all seasonal ranges were of the same value or importance to deer (e.g., Russell 1932). Dixon (1934), the first major publication on California deer, implied that not all winter ranges were the same: "I found that buck brush (*Ceanothus cuneatus*) is utilized heavily by mule deer in winter when heavy snows crowd them down into the lower winter range..." and "...during January...deer...were abundant on the warm south side of the ridge." Dixon refers to Pilot Ridge, Mariposa County, as one of the "...most important wintering grounds of deer in the State..." thereby suggesting a relative ranking of winter ranges existed at least in the minds of biologists. Similarly, McLean (1940) referred to "...four principal winter concentration areas..." in Modoc County.

The 1940s became a significant period for deer management in California (Dasmann et al. 1958). There were too many of them. Deer became a "problem" of great magnitude as 37 of 71 deer ranges surveyed during 1946-47 indicated that populations were out of balance with their habitats resulting in "...depletion of range and waste of deer..." (CDFG 1947). During the next 25 years, deer populations in California would reach their peak and then begin their decline which the Department attempted to moderate through active harvest management (Dasmann et al. 1958). It was during this period that extensive habitat evaluations and deer studies were initiated and use of terms "critical" and "key" became standard terminology in describing ranges.

Designating Ranges as Critical

Perhaps the first reference to "critical" deer ranges in California was in 1947 (CDFG 1947, Project 24-R). A "Survey of the critical summer and winter deer ranges of California" was conducted to determine deer range conditions, particularly where reports of "starvation, crop and range damage, and the increase of the reported deer kill" occurred (CDFG 1947). Input was sought from throughout the state and among agencies, resulting in a list of 71 areas to be considered for critical deer range status in California. Thirty-seven of the areas were recommended to be retained on the list. There was no explicit definition provided by CDFG (1947) for the designation of ranges as critical, however, an examination of the report indicated two areas of intent, or criteria, can be reasonably inferred: 1) crop damage; and 2) habitat condition.

Crop Damage and Critical Deer Range

Areas where substantial crop damage (depredation) by deer occurred appear to have been unquestionably considered critical deer ranges (CDFG 1947). In such areas, the Department rarely provided deer range condition information, and none of the areas removed from the list were crop damage areas confirming that these areas were considered critical from at least a socio-political aspect. Eleven of the 37 areas identified as critical were a consequence of crop damage. It is certain the critical designation was partly used to identify specific deer ranges where conflict with agriculture was substantial. This conflict persisted until at least the 1960s (e.g., Longhurst et al. 1962), and still persists in many areas today. Depredation permits issued by the Department were one barometer of measuring conflict with agriculture, and a record 2,484 permits to kill deer were issued in 1961 (Thomson 1963). By comparison, 159 and 96 depredation permits were issued in California during 2002 and 2003, respectively. Biehn (1951) attributed the crop damage in California to three primary causes: a) the more than doubling of the deer population between 1900 and 1950; b) reduction of natural feed and watering areas as a result of settlement and agricultural development; and c) the planting of crops on historic deer ranges.

Habitat Condition and Critical Deer Winter Range

The majority of deer ranges identified as critical were winter ranges and done so based on their habitat condition (CDFG 1947). Excessive grazing and browsing by livestock and deer; and a shift from grass/forb/shrub to tree-dominated habitats were the primary reasons for the resultant poor to fair condition of the ranges and a critical designation. Hence, deer ranges were considered critical, or not, based on their range condition and not on their perceived value or importance to deer. For example, the report for one area indicated "...allotment heavily stocked, but has beautiful stand of bitterbrush (*Purshia* sp.). Area should be deleted from critical list." Today we consider areas with bitterbrush in any condition to be critical deer ranges. However, it was implied that these deer ranges had a high importance to management and conservation and this was considered fact by the Department as well as by the U.S. Forest Service who participated in the survey: "A tentative agreement with the U.S. Forest Service has been reached to reclassify critical winter deer ranges so that these

areas can be set aside for wildlife use only, if the survey indicates such action as advisable"; and for one area specifically: "Because it is an important winter range of black-tailed deer, land in this critical area (regarding Antelope Creek in Tehama County) is being acquired by the state... By having control of grazing, it is hoped to restore this range to former productivity." (CDFG 1947).

CDFG (1947) did not limit the scope of designating critical ranges to specific areas, but rather took a landscape approach to wildlife and habitat management that has recently become popular again with land management agencies. For example, "...some of the areas fall into geographical units. In suggesting certain areas for detailed investigation, it becomes necessary to study the entire units rather than the individual areas. The most extensive unit is the winter range on the west slope of the Sierra Nevada Mountains. This unit of critical areas extends for about 150 miles and is primarily restricted to the yellow pine belt..." (CDFG 1947). Based on the list of areas evaluated, the area considered critical was deer winter range from Tehama County south to at least Amador County.

Following the 1946-47 survey was the initiation of "California Deer Studies" on 1 July, 1947 when the Fish and Game Commission "...transferred to the University of California responsibility for conducting studies of deer populations in the state which studies would form the basis for future deer management policy. Federal Pittman-Robertson funds to the Department (then Division of Fish and Game) were made available to the University, under terms of a three year contract, to carry on these investigations" (Leopold 1948). This research project (known as Project 28-R) was administered by the university's Museum of Vertebrate Zoology and produced two of the foundation works on California deer that serve as the basis for much of current management (The Jawbone Deer Herd by Leopold et al. 1951, and A Survey of California Deer Herds, Longhurst et al. 1952). These studies discussed the importance of seasonal deer ranges and used the term critical as well as "key" in their descriptions.

Designating Winter Range as Key

In addition to describing ranges as critical, use of the term "key" has been in place for several decades to describe geographic areas as well as important forage species. Dasmann (1948), using terminology likely developed for range management purposes (Stoddard et al. 1975), described "key areas" as "...those mid-winter concentration areas that are subject to more intense cropping than those occurring elsewhere on the range." Key areas were regarded as areas where use was heaviest, for example: "...where stocking does not exceed carrying capacity on key areas, the range will not suffer elsewhere either."

"Key species" for deer (Dasmann 1948) were used to help define key areas by identification of preferred deer browse. Confounding the terms however, these browse species were considered "critical foods on deer ranges" and were the basis for defining what were regarded as critical deer ranges. For example, Leopold et al. (1951) identified buck brush as the most important deer food in the Jawbone area (identified as a critical range in 1946-47)

of the Central Sierra Nevada, and where buck brush was concentrated was the "key range area."

The Interstate Deer Herd Committee (IDHC) was an organized effort of state and federal agencies formed in 1945 to study the declining deer population and the habitats on the Modoc National Forest. The IDHC followed the concept of key browse/forage species such as bitterbrush to identify key areas as those areas on the winter range that furnish the bulk of the winter forage: "If proper balance of use against forage production is maintained within the key areas, the remainder of the range should be automatically safeguarded" (IDHC 1949).

Relationship between Critical and Key Winter Range Designations

In the early 1950s, the distinction between critical and key terminology began to get blurred. Soon to be Director of the Department, Seth Gordon (1950) recommended that the purchase of range land for big game by the recently created Wildlife Conservation Board should be "...limited to very important key areas only" such as concentration areas for wintering deer. He further reported the "...public land administrators are receptive to working out many adjustments in their program of land use to benefit deer. Examples of such cooperation are the reservations of winter deer ranges on the Plumas... Modoc, Lassen, Tahoe, Inyo, El Dorado, Sequoia, Klamath, Trinity, and Mendocino national forests." Dasmann (1952) described critical deer forage as vital to the best survival of the animals on a specific range and key areas were described as "Too critically important to sacrifice..." Schneegas and Franklin (1972) located and mapped the key winter range in the Mineral King area as a result of proposed development of the area by the Walt Disney Corporation and the Forest Service for recreation purposes. Browning et al. (1973) mention critical habitat and key habitat of deer on the west slope for the Railroad Flat area of Calaveras County.

An often heard perspective on the meaning of critical or key ranges has been they are areas "where deer go to die." This definition seems to fit only for winter ranges as areas of last resort for food and cover during harsh winters. It implies that the range condition is poor and unable to sustain deer (otherwise they wouldn't die), resulting in die-offs, usually in the late winter period. Use of the terms key or critical with the above perspective supports the original concept that critical ranges are in poor shape. Leach (1956) in summarizing his investigation of deer food habits for the Great Basin deer herds in California reported "In severe winters, deer are forced to rely on browse species which normally are eaten less extensively... it is apparent deer will utilize whatever food is available and preference becomes secondary to survival in periods of adverse conditions." Dasmann and Hjersman (1958) also studied deer on the east side from 1951-1956 and reported "...deep snows forced deer into marginal wintering areas at lower elevations, where browse was either scarce or made up of species of sub-standard food value... unusually heavy snows pushed deer below the bitterbrush zone on some ranges."

It is obvious the terms critical and key were often used interchangeably. Evaluating these descriptions of deer ranges suggests that key areas and key plant species occurred within

deer ranges that were overall considered critical. Intuitively then, the conclusion must be that key areas were a subset of a broader critical deer range.

Summer Range

Designation of summer ranges for deer in California included by default, the areas of deer range not considered winter range. Longhurst et al. (1952) estimated there were 217,900 square km (84,100 sq. mi.) of summer range and 138,700 square km (53,500 sq. mi.) of winter range in California. Historically, summer ranges have received less attention than winter ranges as a concern for deer in the state because of abundant long-term forest disturbances that favored deer and other early successional associated species. Also, there is much larger acreage of summer range than winter range and a higher proportion as wildland managed by the federal government agencies (primarily U.S. Forest Service and National Park Service). For example, Leopold et al. (1951) estimated summer range comprised seven times the area (692 vs 96 sq km; 267 vs 37 sq mi.) of winter range in the Jawbone deer herd range. Such summer ranges are not at risk of being lost as wildlife habitat although the quality of the habitat does change over time with forestry practices, fire suppression, and livestock grazing.

Advances in conservation efforts and fire suppression have led to reduced levels of disturbance to California's forests. Consequently, the quality of deer habitats, both summer and winter, has declined. Dixon (1934) however, observed that "...on our forest lands serious complications result if the range is overstocked early in the summer with domestic sheep or cattle; so that little or no green grass remains by the time the fawns should be weaned." Similar concerns about summer range conditions have been echoed over time (Longhurst et al. 1952, Salwasser et al. 1978, Loft et al. 1993, CDFG et al. 1998).

There were a few summer range areas initially considered critical in the 1947 assessment, among them, Monache Meadows in Tulare County. This area of deer summer range is, and had been, reportedly overgrazed since at least the 1947 report, and remains an area of high concern and controversy for mule deer, but now more significantly, for Volcano Creek golden trout (*Oncorhynchus mykiss aguabonita*).

The concern for habitat values on summer ranges has increased over time. Forested areas of checkerboard ownership, such as north of Lake Tahoe or in Siskiyou County, have substantial private forestland that is subject to more intensive harvest strategies than intermixed public forest lands (U.S. Forest Service lands). Some of these private lands interspersed with public land have potential to be developed to the point they are no longer viable as habitat. Bowyer and Bleich (1984) evaluated spring-summer ranges of deer in the mountains of San Diego County and suggested that livestock grazing negatively influenced deer use of mountain meadows. Recent work (Loft et al. 1993, CDFG et al. 1998) has similarly identified negative consequences of grazing, fire suppression, and maturation of vegetation communities to the quality of summer range.

Critical summer range

Critical summer range is a term that is not universally used throughout California. The term was used in the original report (CDFG 1947), and was further developed in a northern Sierra Nevada planning effort during the 1980s where the Department was developing maps and overlays for county planning efforts. Specific areas of deer summer range had been identified through study, investigation, and professional judgment as being critical for a deer herd, much like winter ranges had traditionally been identified. These areas were primarily known fawning areas and corridors/routes for migration. The intent of such designations was to identify certain areas as being more important for deer populations than the greater area of summer range.

A difficulty with interpretation of this designation statewide is that only one Department administrative region actively used the term. Hence, a look at a statewide map with these designations would misrepresent the summer range areas the Department believed were most important for deer. No similar level of detailed consideration has occurred in other Department administrative regions although similarly important areas could probably be identified.

Schneegas and Franklin (1972) evaluated the Mineral King Deer herd because of a proposed recreational development by the Disney Company. In that study, they identified both key winter and key summer areas.

Fawning Area

The development of wildlife telemetry technology in the 1970s aided immensely in the identification of specific components of deer range such as fawning areas, holding areas, and migration routes. Fawning areas are typically considered to be complexes of high quality foraging habitat with abundant cover interspersed where adult females give birth and nourish fawns. Meadow, riparian, and shrub types with deciduous tree [e.g., quaking aspen, *(Populus tremuloides*) or white alder (*Alnus rhombifolia*)] or conifer overstory in proximity create a complex of vegetation structures and canopies that are important for hiding fawns from predators. Schneegas and Franklin (1972) mention key fawning areas needing protection at critical times.

The terms "propagation unit" and "population center" are infrequently used in the Department. The long-term study of the North Kings Deer Herd in the Central Sierra Nevada (Ashcraft 1975, Bertram 1984) first used these terms that were adapted from Grange (1949). Propagation units are defined as places where single does find adequate food, water, cover and other necessities to rear their fawns. Population Centers are defined as an aggregation of propagation units. Fawning area has become the more widely used term to describe such areas.

Holding Area

Holding areas were identified by Bertram and Rempel (1977) as areas along migration corridors that deer used during spring and fall migrations. Spring migration is typically a gradual upward move in elevation as deer follow the receding snowlines. Deer may delay in these holding areas for a few days to several weeks depending on the weather. Loft et al. (1987) reported radio-collared female deer giving birth on holding areas in 1983, a year when their Stanislaus National Forest summer range was covered in snow until July. Fall holding areas differ from spring in that they appear to be situated in areas where a rapid descent in elevation is possible with the onset of a storm (Bertram and Rempel 1977). Fall holding areas on the west slope of the Sierra Nevada include areas of abundant oak mast, an important food source for deer prior to winter. Kucera (1992) reported extensive use of spring holding areas by mule deer on the east slope of the Sierra Nevada as they waited to ascend the steep mountains and cross the Sierra Crest to summer range.

Mule deer migrating to the east slope from the Sierra Nevada summer ranges in the fall also use holding areas on their way to distant winter ranges (Loft et al. 1987). These areas include shrub dominated basins and flats of big sagebrush (*Artemisia tridentata*) and bitterbrush. However, Kucera (1992) did not report such a fall holding pattern in his study area where there was an abrupt elevational change between summer and winter ranges.

Relationship between deer ranges and conservation of other wildlife

"While decline in deer numbers may be alarming in itself, it becomes more alarming when considered as a symptom of a common malady affecting wildlife in general... What affects one most certainly has an impact on the rest of the community" (CDFG 1976). Deer are among the most studied wildlife species in California thanks to decades of interest in them as a principal game animal. For some herds, data exist as far back as the early 1900s. Because deer are so widely distributed in California, they are considered a reasonable indicator of California's changing wildland environment. Population trends of deer have been monitored over decades and reflect general habitat trends as influenced by factors such as plant succession, fire, grazing, and direct loss of habitat through human encroachment. Because of the existence of long-term data on deer population trends and seasonal ranges, combined with their well established popularity and economic value, deer have been an important species in the Department's environmental review process [reviewing of proposed projects that are subject to the California Environmental Quality Act (CEQA)]. Additionally, their requirements for habitat continuity at a large scale- having winter range, summer range, and corridors connecting them- has required land managers to consider landscape level management strategies. In 1913 for example, Frank Clarke of the Department wrote: "There are many large tracts in California...that are excellent regions for game reservations. An ideal system would be to create such reservations all over the state, in close proximity that game could pass from one reservation to another. Such a commingling of individuals is apt to be of greatest necessity in the future, to prevent the natural outcome of inbreeding, which might result among isolated groups of animals or even birds..." Approximately one-fourth of the acreage acquired by the State through the Wildlife Conservation Board (115,834 ac of

487,666 ac, source: CDFG Lands Inventory Fact Sheet) was acquired primarily for deer habitat value.

HISTORICAL PERSPECTIVE OF MULE DEER POPULATIONS IN CALIFORNIA

PRESETTLEMENT DEER POPULATIONS

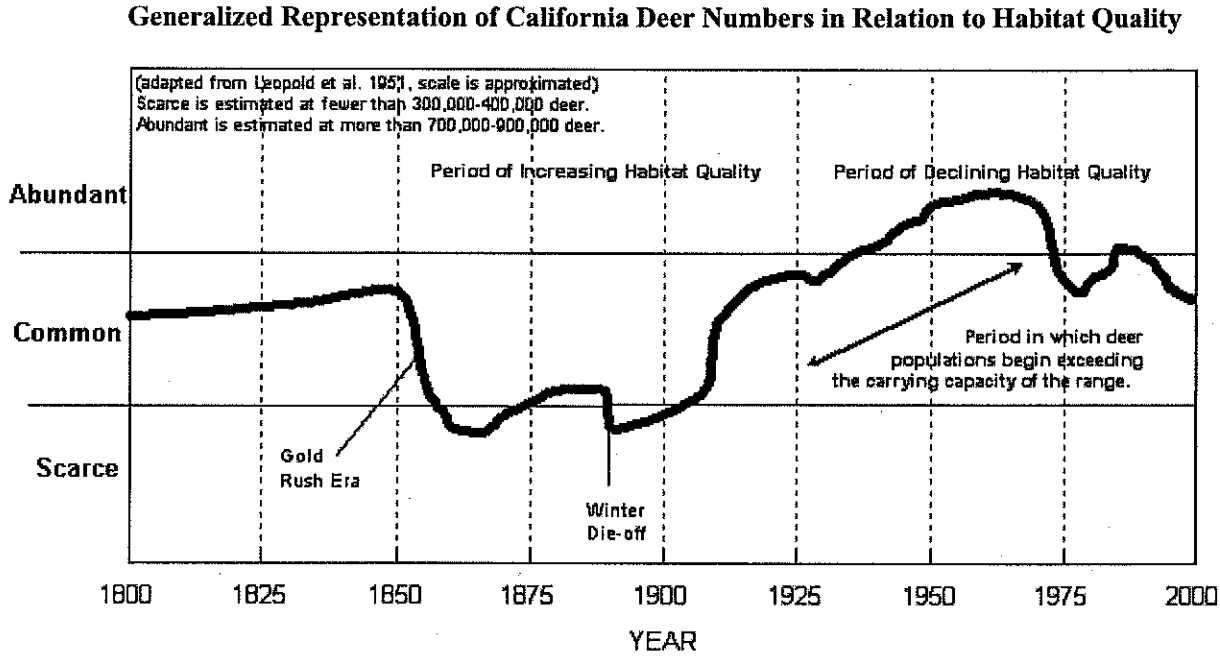
Prior to settlement by European man (before the 1700s), deer in California appear to have been less abundant than in modern times because of the lack of large-scale habitat disturbance (Figure 3-3). On forested ranges, deer are well known to be an early successional species that thrives on disturbed habitat dominated by shrubs and herbaceous plant species that are succulent and nutritious (Leopold 1950).

Spanish settlements were first established in the vicinity of San Diego in the late 1700s. Subsequently, Spanish missionaries and settlers explored and occupied most of central and southern coastal California. Unfortunately, references to wildlife are infrequent in journals of that period. Deer were mentioned as being common in the San Francisco Bay area and on the plains west of the San Jacinto and San Bernardino mountains (Bolton 1930). In addition, deer were recorded inhabiting areas around San Diego, Los Angeles and San Luis Obispo (Priestley 1937).

Settlers impacted native vegetation, principally as a result of their introduction of domestic cattle, sheep, horses and goats. Mediterranean annual grasses and forbs, which replaced much of the original perennials throughout the Central Valley and foothills, were also introduced. By 1825, there were an estimated 1,000,000 head of sheep at the Spanish missions and about as many more kept by ranchers outside the missions (Miller 1942).

The descriptions of early 1800s explorers and settlers provide the closest estimate of what deer and other wildlife populations may have been like before European settlers. From these accounts, it appears that deer were originally numerous in the coastal mountains from San Diego to the Klamath River and in the foothills bordering the Central Valley. Deer were observed to be locally abundant in the Sierra Nevada, the Great Basin area, and the Central Valley. However, the references to Sierra Nevada deer (summer range) typically occurred in the fall when migrations may have already occurred, or for the Great Basin deer (winter range), observations may have been prior to migration to the winter ranges when deer would be scarce. Deer were reportedly scarce in the desert and dense forests in the northwest. Jedediah Smith traveled over much of California in 1827-1828. Along the lower Stanislaus River, he observed deer; however, elk and antelope were more abundant. His party also encountered deer in the vicinity of the Mokelumne, American, Feather, and Yuba rivers, and he indicated that deer were abundant along the Trinity and Klamath Rivers. When Smith's party explored the mountains north of the Klamath, however, they saw no deer, nor did they encounter any along the coast until the vicinity of Lake Earl in Del Norte County (Sullivan 1934).

Figure 3-3. Trend in California Deer Numbers



In October and November of 1832, John Work entered Modoc County from the north and followed the Pit River down to Hat Creek where he crossed the divide to Cow Creek. Work's party found practically no deer until they reached Cow Creek (winter range). Around the borders of the Sacramento Valley and in Sonoma, Napa and Lake Counties, Work's party found deer to be abundant (Maloney 1945).

Ellison's 1937 chronicle of the adventures of George Nidever mentions an abundance of deer in the Santa Barbara area in 1837, which supports the observation made by Longinos Martinez 50 years earlier.

Zenas Leonard crossed the Sierra Nevada with the Walker party in October 1833 (a time when migration may have already occurred). No deer were reported until the rim of Yosemite was reached, where they killed one. When they descended lower, perhaps to the floor of Yosemite Valley, they found game in abundance (on the winter range). Moving out toward the San Joaquin Valley, they continued to find deer associated with riparian habitats (Quaife 1934). Fremont traveled along the eastern base of the Sierra in 1844, finally crossing the mountains in February. He found abundant deer sign on one winter range area

northwest of Bridgeport, but elsewhere saw no deer until well down the west slope (not surprising). In the foothills along the lower American River, deer were encountered in abundance (Fremont 1853). In 1846, Edwin Bryant traveled up the Truckee River and over Donner Pass. He reports seeing deer in the Truckee River Canyon in August. Crossing the mountains he saw no deer, but stated that deer tracks were "numerous". When the party reached the valley, they saw large numbers of deer, as well as elk and antelope. Bryant also reports deer as numerous at this time in the Santa Clara Valley foothills, in eastern Napa County and around Clear Lake (Bryant 1936).

Early observations suggest that there were substantial numbers of deer that were non-migratory and inhabited the foothill-woodland and chaparral communities (Leopold *et al.* 1951, Longhurst *et al.* 1952). Deer were particularly sought (their abundance is inferred) by Indians in the areas where deerbrush (*Ceanothus integerrimus*) was abundant or where deer were concentrated on migration routes in the fall (Leopold *et al.* 1951). These areas are primarily the transitional ranges used by West Slope deer today (approximately 2,500-5,500 foot elevations).

DEER POPULATIONS 1848-1900

The California Gold Rush of 1849 was the beginning of dramatic change in California. The greatest initial effect on deer was from market hunting to supply venison for mining camps (Leopold *et al.* 1951). This was accompanied well into the 1900s by exploitive timber harvesting, slash fires and wildfires that resulted in vast increases in the acreage of early successional habitat throughout forest communities at elevations of 3,000 to 6,000 feet. However, the increase in habitat so desirable to deer (Leopold 1950) was not immediately followed by increases in deer populations, likely because of continued heavy unregulated hunting and other factors. Miners shot deer year-round for meat and hides, and they altered the deer range by logging, burning, grazing and clearing. Some of these changes ultimately benefited the deer, but the immediate effect of settlement was a decrease in deer numbers.

Because domestic livestock were scarce in mining areas and game brought high prices, many miners abandoned the diggings to make a good living market hunting (Audubon and Bachman 1854, Hittell 1911). For example, Hunter (1924) states that 35,000 deer hides were shipped by a single firm in Redding in the year 1880. The immediate effect of uninhibited shooting was a rapid decrease in deer in many areas. From 1850 until about 1903, commercial deer hunting camps and market hunters operated throughout the State. (Later, the recovery of deer populations to unprecedented high numbers illustrated their resilience to unregulated heavy take.)

Following the Gold Rush, livestock increased substantially over much of the State. In 1850, only about 17,500 sheep were reported to be in California, compared with an estimated 2,000,000 in 1825 (Miller 1942). Subsequently however, great numbers of livestock were imported from other states. Between 1852 and 1857, 551,000 sheep were driven into California from New Mexico. Large herds of cattle were brought from Texas and Mexico.

Livestock spread far beyond the boundaries of Spanish California. They reached the north coast area in the 1850s and also came into Lassen County at this time.

Two years of successive drought in the early 1860s prompted the first regular use of Sierra Nevada mountain meadow summer ranges by livestock (Burcham 1957). As low elevation forage matured or was eaten, cattle and sheep were driven into the high country to graze the productive summer ranges. The destructiveness of uncontrolled livestock grazing on mountain summer ranges that continued into the early 1900s is well known (Leopold *et al.* 1951, Longhurst *et al.* 1952). Yet the potentially negative effects of livestock grazing on deer during this period were likely overshadowed by hunting, and by the tremendous level of beneficial disturbance associated with logging, mining and fire.

The number of domestic livestock in California peaked in the 1870s. During the 1880s and 1890s, drought conditions and periodic harsh winters led to significant losses in livestock in some areas, and there was an overall decline in numbers. Although competition between livestock and deer may have been an important factor contributing to the decline of deer in some areas, livestock grazing may have provided some benefits. Grazing by livestock can create conditions favorable to the invasion of woody plants, valuable as winter deer browse, into areas that previously had a low capacity for deer (Leopold 1950), or could help get desirable browse species such as bitterbrush established by severely grazing the potentially competing herbaceous vegetation.

The historical effects of livestock grazing on deer winter range habitats are not as well described as they are for mountain meadow summer ranges, likely because the grassland communities on the winter range were more resilient to grazing. However, Leopold (1950) thought overgrazing resulted in expansion of chaparral into grassland and oak-woodland communities at winter range elevations to the benefit of deer.

The impacts of excessive grazing may have initially increased the numbers of deer in the State, as early successional range and forest vegetation types were established. Forage plants which were more favorable to deer than those that dominated the original vegetation either invaded or increased in abundance in response to grazing pressure (Longhurst *et al.* 1976).

In addition to hunting and livestock competition, deer may have suffered from periodic severe winters between 1879 and 1907. In the northern part of the State, the effects of severe winters, starting in 1879-80 and recurring during the next three decades, likely contributed to the scarcity of deer in the early 1900s. Milder winters and drier summers since that time may have contributed to the restoration of deer in many parts of northern California (Heald 1949).

Large-scale logging began with the Gold Rush and spread rapidly over the forested areas of the State. In the redwoods of the Santa Cruz Mountains, logging peaked in 1875 (Jensen 1939). Near Lake Tahoe, logging intensively occurred during the 1860-70s, when lumber was shipped to the mines at Virginia City, Nevada. By 1892, when the first national forests

were established, most of the timbered areas of California were being exploited, and large acreages had been slashed and burned. In subsequent years, the clearings developed into brush fields, which supported many more deer than the original forest; hence the logging activity, which later would be shown to have numerous deleterious impacts on resources, modified habitats to the benefit of deer.

California was a pioneer state in enacting wildlife conservation legislation. In 1883, a law was enacted providing legal protection from hunting to does and fawns. In 1893, the open season on deer was reduced to six weeks. Deer populations were at their lowest during this period, needing some protection. Combined with the positive effects of habitat change and an increasing level of protection, numbers began to increase as 1900 approached.

DEER POPULATIONS 1900-1960

In 1901, a bag limit was placed on deer, restricting the kill to three bucks per hunter, to be taken during a two-month open season. The sale of deer meat and hides was prohibited in the same year. In 1905, the bag limit was reduced to two bucks. Early harvest restrictions had little effect, for there was no adequate means of enforcing the laws. A change came in 1907, when a hunting license was required and the revenue from the sale of licenses was used to enforce game laws. Further limitations on hunting were adopted later. In 1919, the take of spike bucks was made illegal. This measure was intended to preserve the yearling age class of deer as breeding stock. The elimination of unrestricted hunting, combined with increasingly effective enforcement, contributed substantially to the increase of deer in the period 1910 to 1920.

The year 1891 was the beginning of the National Forest System, and the USFS was established in 1905. The creation of the national forests was of great significance to the future of deer and other wildlife species. One effect was to place USFS personnel in areas where they gave assistance to the State in game law enforcement. Of perhaps greater importance, however, was the initiation of restrictions placed on livestock grazing. Most of the national forest areas had been severely overgrazed, with the mountains overstocked with cattle and sheep. Numbers of cattle and sheep grazed in the national forests decreased to the extent that in 1948 there were only about 27 percent of the numbers that were permitted in 1918-19. This began to allow for some range recovery and likely provided additional forage for deer.

Mountain lion, bear, coyote and bobcat populations were reduced in the early 1900s through unregulated hunting, trapping, and poisoning. Wolf and grizzly bear populations were exterminated in California by the early 1920s (Grinnell *et al.* 1937). Predator control likely contributed to the rapid increase of deer in the period 1910 to 1930 and may have contributed to local overpopulations of deer by the 1940s (Longhurst *et al.* 1952).

The spread of lumbering activities opened up much of the densely forested areas of the State. Old-growth forests with little undergrowth supported few deer, but the logged (and frequently burned) areas developed stands of shrub vegetation that supplied forage for deer.

As a result, good deer range was created in areas that historically had not supported large numbers of deer.

Fires following logging activities probably created more shrub fields than the logging itself. In chaparral habitat in the Sierra foothills, fires pushed back the lower limit of the timber and created deer winter range at higher elevations than had previously been realized. Fire in chaparral habitats of the coast ranges opened up dense shrub fields and promoted resprouting, which increased the carrying capacity for deer.

Deer populations responded dramatically to improved habitat conditions, enactment of restrictive hunting regulations, enforcement of game laws, control of predators and possibly mild weather patterns between 1900 and the 1950s (Mackie *et al.* 1982). In 1956, in response to overpopulations of deer in many areas of the State, hunters were allowed to take one deer of either sex during the last three days of the early and late seasons in 35 counties. Justification and evidence for proposing such hunts came from 11 years of data indicating that depletion of deer ranges had begun and 37 of 71 deer ranges were overstocked (Dasmann *et al.* 1958). The statewide harvest that year was estimated at about 108,400 deer, of which approximately 38,000 were does. As expected, record buck harvests were recorded in 1959 and 1960 in response to the 1956 antlerless harvest.

Because of public opposition following the taking of female deer in 1956, Legislation was enacted that gave 37 counties in California the authority to veto Department recommendations to take antlerless deer (sections 457-459, Fish and Game Code).

DEER POPULATIONS 1960-PRESENT

Deer numbers declined across the western United States during the 1960s and into the mid 1970s (Longhurst *et al.* 1976, Connolly 1981). Efforts have been made to relate this decline to factors such as habitat deterioration, predation, competition with livestock, habitat loss due to human development and hunting. However, none of these factors can individually explain the population declines in all areas in which they occurred (Mackie *et al.* 1982, 1998, Wood *et al.* 1989).

Habitat quantity is continually declining because of urbanization and development. Ultimately, deer are limited by the quantity and quality of their habitat (Longhurst *et al.* 1976, Connolly 1981), although it is recognized that other environmental factors play important roles in the dynamics of deer populations (Mackie et al. 1998). "Permanent" loss of habitat directly reduces carrying capacity by reducing the acreage of habitat available, and at least in the short-term, by increasing deer pressure on remaining habitats. The location where such habitat losses occur can be of greater consequence than how much habitat is lost. Little can be done about increasing the quantity of habitat for deer; however, we can improve habitat quality to meet deer herd objectives through more active land management. Since the mid 1970s, the overall deer population in California has been relatively stable (Figure 3-3). The purpose of Figure 3-3 was to illustrate that deer populations in California peaked in

the late 1950s to 1960s (see also Figure 3-4) and are now at a lower level of statewide population. This is due largely to long-term declines in habitat quality throughout the State.

Fawn ratios represent the proportion of fawns relative to the number of does. Spring fawn ratios are indicators of survival of fawns to adulthood (approximately 11 months old). Approximately 150 fawns are born for every 100 does (Lassen *et al.* 1952, Bischoff 1958, Salwasser *et al.* 1978, Bertram 1984 and others). About half (50 percent) of fawns born in California die within the first two months of life (Salwasser *et al.* 1978) and another one-quarter (25 percent) will not survive the winter (Department data).

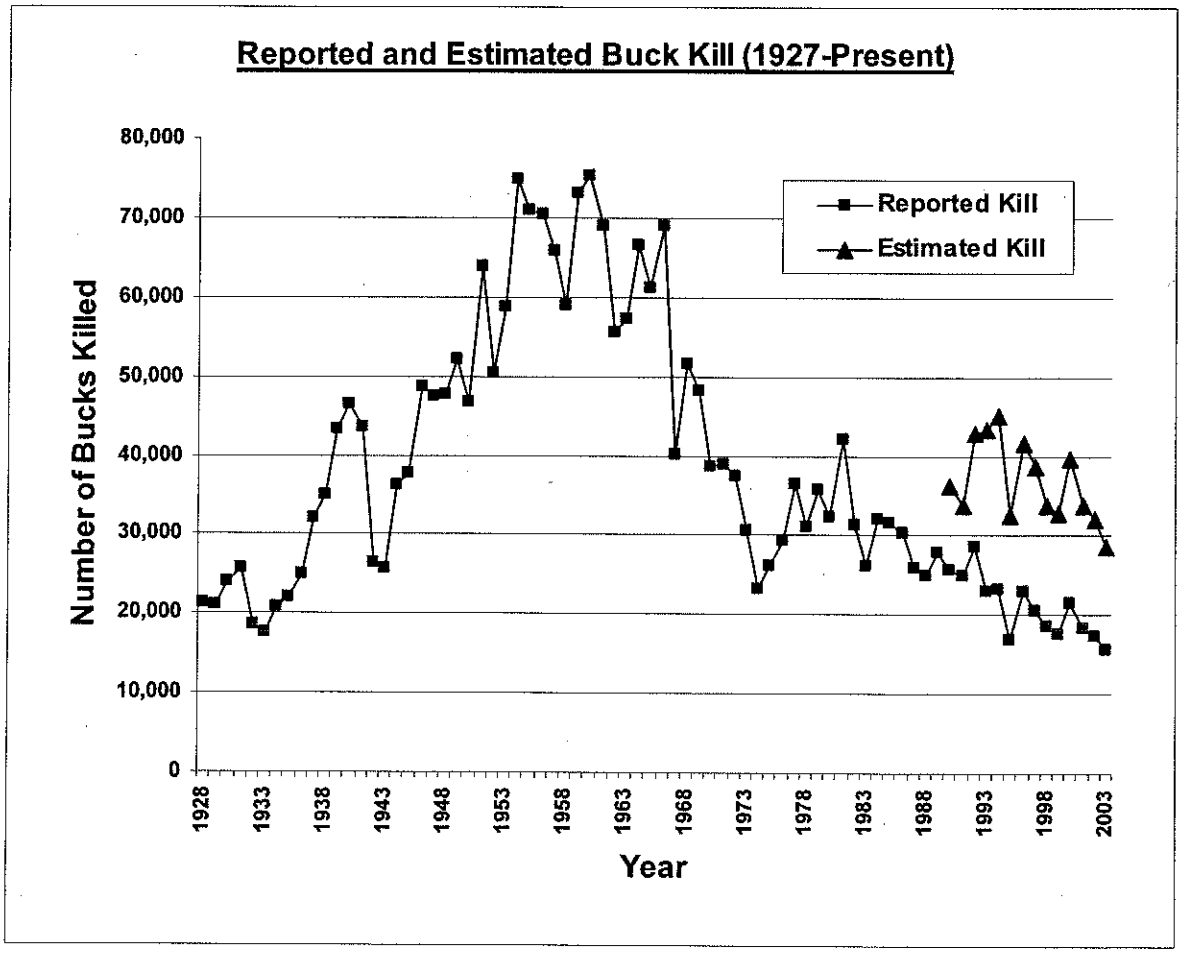
The current harvest strategy is primarily buck-only hunting. In 2003, the statewide estimated deer harvest was 29,086 (reported plus unreported kill). Unreported harvest varies by zone, but overall for the State in 2002 it was estimated to be about 40 percent of the total harvest. This estimate is based on data collected at hunter check stations and from a statewide meat processing plant survey. In addition, a scientifically based phone survey of hunters by zone was completed in 1993. The purpose of the survey was to collect accurate deer harvest information (± five percent confidence) and other supporting information about deer hunters. These harvest estimates, by zone, were used in this document where appropriate. Less than two percent of the total deer harvested were antlerless deer. The total harvest of deer (reported plus unreported kill) represents about three to seven percent of the total state population annually.

A major factor regulating deer populations in the State is the availability of quality forage, a circumstance common to mule deer herds throughout the western United States (Wallmo 1981). One indication of how forage can influence deer is through fawn survival rates. Populations at or near carrying capacity experiencing relatively high fawn survival rates generally have high levels of adult mortality due to harvest, predation, poaching, loss on highways, etc. The low fawn survival rate in the current California population appears to be due to the inability of young fawns to compete with other herbivores, including livestock and adult deer for the limited quality forage, as well as poor nutritional conditions during late summer and late winter.

In a more general context, deer populations in California function in a very diverse set of complex ecosystems. The interface between topography and local climate results in a mosaic of vegetation communities and a characteristic faunal array along with the distribution of land uses. All this creates the arrangement of habitats that satisfies the different requirements of mule deer. Therefore, the spectrum of deer densities among the various California environments is determined by ecological factors largely beyond the control of management.

Figure 3-4. Reported and Estimated Buck Harvest

Deer harvest in California reflects the general changes in deer populations and is affected by long-term changes in habitat quality. Beginning in 1967, a change to self-validation of deer tags was imposed on hunters, and there was a marked drop in the deer tag return. Self-validation was eliminated in 1970; however, the tag return rate remained low, with a 35-45 percent estimated non-return rate.



Note: Reported kill numbers are based on tag returns only and represent the minimum number harvested. Estimated kill reporting began in 1990 and accounts for those tags not returned by successful hunters.

Deer Assessment Units (DAUs)

Traditional management approached deer populations as being the product of their habitat using concepts that minimized the importance of variation in all aspects of the environment (Mackie et al. 1998). The reality is that deer populations function within complex ecosystems that vary greatly in California. While habitat is the foundation of our deer populations, the Department has come to recognize the influence that the dynamics of each unique ecosystem plays in the population dynamics of our deer populations.

To help guide future management, the Department is beginning to use a new strategy for analyzing deer populations and habitat status. Within this strategy, the state is divided into 11 Deer Assessment Units (DAUs) which were developed by combining existing hunt zones into units based on similarities. The intent is to have deer population/habitat analyses and deer harvest recommendations based more on environmental and ecological factors than on the somewhat ecologically artificial boundaries of existing hunt zones. The DAU system reduces the number of geographic areas for data analysis from 44 to 11 (44 existing hunt zones versus 11 proposed DAUs) thereby providing more power to data analysis and reducing the amount of variability in Department estimates. Figure 3-5 illustrates the DAUs and the deer hunt zones contained within each area.

Because of changes in administrative hunt zone boundaries over the years, it was not feasible to re-create deer populations prior to 1990 for each DAU. Hence, deer population estimates were made for the period 1996-2004 and trends are shown in figures 3-6 and 3-7. Annual variation in deer population estimates may be quite high due to annual changes in environmental conditions, so it is more illustrative to examine the trend in numbers over time, at least 3-5 years. The Department concluded that populations in each DAU were higher in the past, compared to the present.

However, area specific deer populations (general trend) differ from the statewide average. Deer populations are considered increasing in DAU 5 the Central Sierra Nevada (Figure 3-6). Populations are considered stable in DAUs 8, 10 and 11 (Figure 3-6); and populations are declining in DAUs 1 and 2, 3, 4, 6, 7 and 9 (Figure 3-7).

Figure 3-5. Deer Assessment Units (DAUs)
Developed for Assessing Populations and Habitats

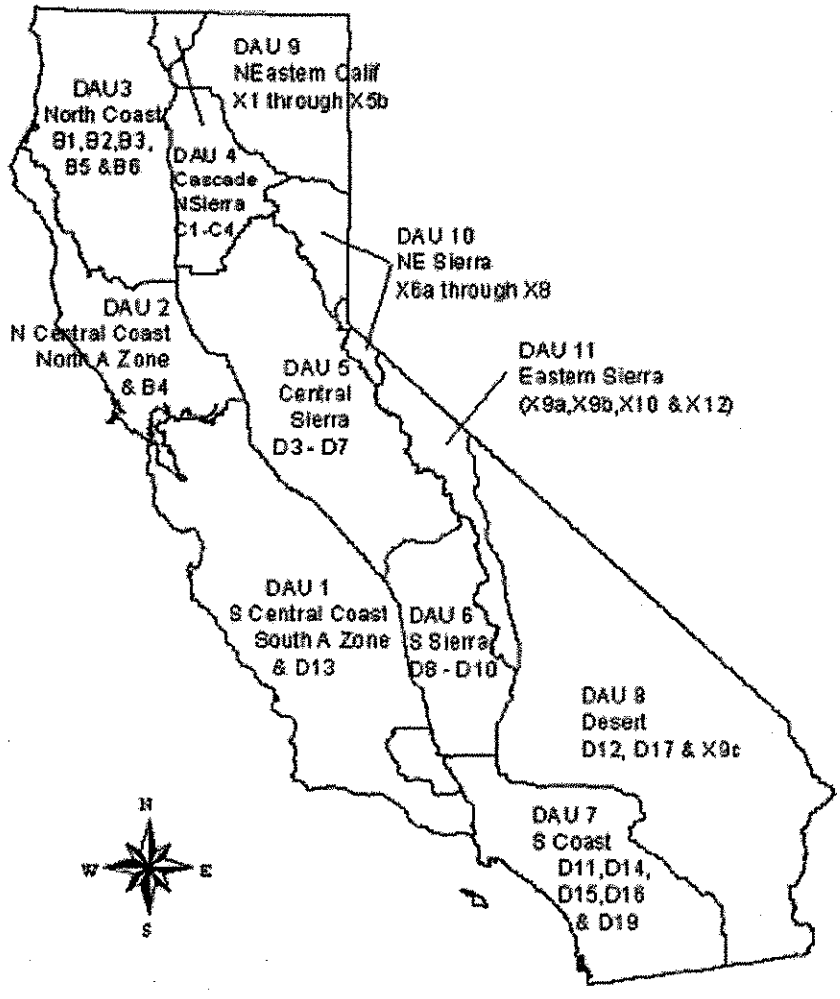
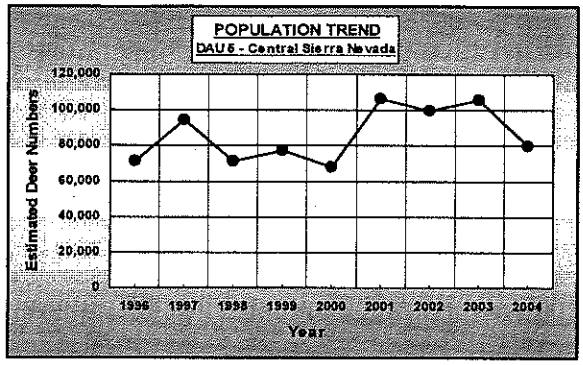
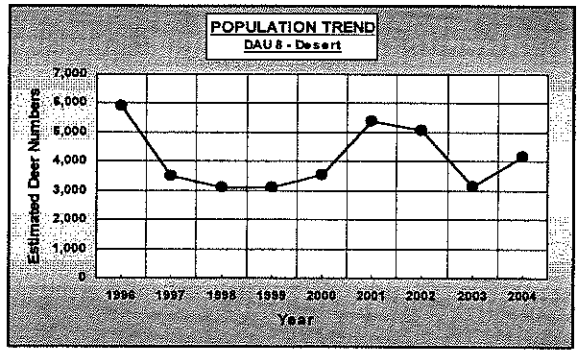
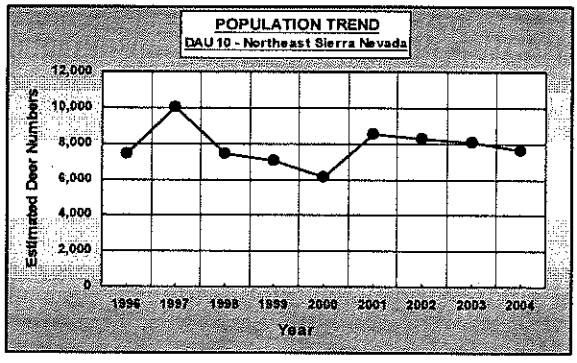
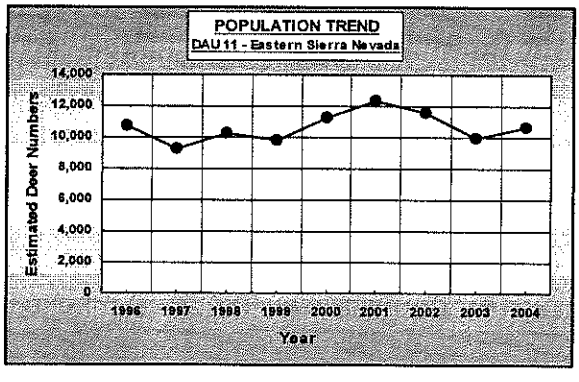


Figure 3-6. Stable or Upward-Trending DAUs
Note: Scales vary among DAUs.









of deer habitats by not institutionalizing prescribed fire or natural fire (let-burn) on a significant scale. For example, of the approximately 31 million wildland acres that CDF has jurisdiction over, an average of 144,000 acres burn annually, only about 1/2 of one percent. A corollary is that we actively move away from diverse ecosystems having adequate representation of the varied successional communities, in part because of fire suppression efforts.

Evidence of the positive response of deer to the forage benefits of large wildfires is common. Typically, improved forage caused by large fires results in increased fat reserves, body weight, and productivity. On many forested ranges, deerbrush (*Ceanothus integerrimus*) is a common and desirable browse species for deer after fire. The 1987 fires on the Klamath (e.g., Gallagher and McCullough 1992) and Stanislaus forests are examples of large fires that benefit deer and other early successional wildlife on a landscape perspective. These benefits translate into more deer available for hunters, although the benefit may be short-lived in the absence of either-sex hunting (Longhurst and Connolly 1970) and because of the maturing vegetation. Fire-adapted shrub species are typically favored when burning occurs at the time of year that plants have adapted to, usually in the late summer or early fall.

A common use of prescribed fire is as prevention against large wildland fires that endanger structures and valuable timber stands (CDF 1995). However, such fires do not necessarily benefit deer or other wildlife because of the timing. Timber stand enhancement efforts that employ prescribed fire are another example in which the understory forage and cover may be lost, never to return because of a dense overstory canopy.

The Department's deer program has funded prescribed fire projects in cooperation with the USFS and BLM. Over the years, we have learned that the most effective fires are those in excess of 400 acres each, are a component of a larger watershed approach that establishes mosaics of varying successional stages, and are conducted where wildlife value is the priority (compared to fuel reduction or timber stand improvement as priority). The Department still advocates prescribed fire in the "right" habitats and under the right conditions on public lands, but except in carefully selected instances, do not currently fund USFS or BLM fire projects.

On Great Basin ranges east of the Sierra, fire is a completely different story, with largely negative effects on deer habitat. Recently burned areas provide no browse, thermal cover, or hiding cover for wintering deer (Loft and Menke 1990). Contributing to the deer problems on deer ranges between Susanville and Reno are the large amounts burned in the mid-1980s, in excess of 200,000 acres. Faster and more effective response to suppress summer wildfires in remaining east side shrub ranges is desirable from a deer, as well as plant community, perspective. Summer prescribed burning in these communities to enhance herbaceous production generally results in fire so hot that the few remaining desirable shrub species may be killed. Ongoing invasion by annual grasses, and expansion and increase of juniper woodlands, also contribute to declining forage availability for herbivores and therefore increased competition between deer and livestock.

Encroachment by development into privately owned wildlands necessitates greater vigilance and fire suppression on these and nearby lands (public or private) that otherwise could benefit from fire. Because of such intense fire suppression efforts on private lands, the Department believes the ability to interject some diversity on public lands through the use of fire is becoming more important and should become a higher priority.

Management Away from Early-Mid Successional Habitats Through Timber Management Practices and Reforestation Efforts

Timber management practices during the past several decades have suppressed the diversity of habitats and early successional stages in favor of tree production. For example, renewed and intensive efforts to improve tree growth and health in second-growth forests through whole-tree (biomass) thinning and herbicide spraying results in a meager understory of forage and cover for deer and other early successional dependent wildlife. Wildlife must then rely on other areas having suitable habitat components such as food and cover, resulting in increased competition among wildlife and between wildlife and livestock; and increased susceptibility to habitat degradation and lowered carrying capacity.

Forest Thinning

Thinning is used to help restore tree stands to a more healthy condition by removing undesirable trees. It "increases merchantable yields on trees by distributing growth to a lesser number of larger stems, similar to thinning a row of carrots" (USDA Forest Service 1996). While this may improve tree health, the Department does not believe it necessarily improves forest health which includes all components of a diverse forest system. Typically, manipulated second-growth forest stands have minimal understory vegetation in them. Use of prescribed burns to reduce wildfire risk also reduces vegetation which provides food and cover.

Herbicide Treatments

Herbicide sprays are frequently used following fire in conifer forests to kill the re-establishing herbaceous and woody shrub vegetation prior to transplanting conifer seedlings on such sites. This practice has been common on private timberlands (examples can be seen west of Burney on Highway 299 and east of Placerville on Highway 50) and has been reinstituted in the past few years on public lands administered by the Forest Service (e.g., Stanislaus and Eldorado forests). Aerial application of herbicides can eliminate large tracts of herbaceous and shrub vegetation as suitable habitat.

Whole-Tree Removal (Biomass Thinning)

Kucera and Barrett (1995) assessed the effects of thinning on wildlife habitat in Northern California. This activity is conducted on several forests in Northern California (Plumas, Lassen, Shasta-Trinity, and Modoc for example). The Lassen National Forest reportedly has thinned more than 7,000 acres per year; and approximately 60,000 acres are thinned

annually statewide. However, the majority of thinning occurs on private lands between Redding and Susanville.

Thinning results in an immediate decrease in thermal and hiding cover, and may result in a decline in forage. Wildlife that benefit from post-fire shrub fields or dense understory, such as deer, may not benefit in the short term. The authors concluded that the structural consequences of biomass harvest as currently practiced are not consistent with good deer habitat, and livestock grazing tends to compound the problem.

The Department is of the opinion that the long-term effects of whole-tree thinning on wildlife and wildlife habitat are not well-understood, but appear to be negative for at least 10 years; that development of a shrub layer following treatments is rare; and that the use of this practice on private timberlands increases the concern about conducting the practice on public lands where there exists multiple use mandates.

Livestock Grazing Impacts on Important Habitats or Natural Communities Such as Mountain Meadow-Riparian, Aspen, Oak-Woodland, and Shrub-Dominated Ranges

Grazing on California rangelands administered by the USFS and BLM has occurred for over 100 years. The Department itself uses livestock grazing to achieve specific vegetation objectives for the benefit of wildlife on some of the lands we administer. Discussion of livestock impacts on deer (or other large native herbivores) in California frequently recognizes that deer populations were at their highest at about the same time that livestock numbers were at their highest. However, this was during the period that we were still "flying high" with an abundance of early successional habitats throughout forested ranges in the State.

Cattle are the only herbivore that deer may be in widespread competition with because numbers of domestic sheep are continually declining. Historically, the competitive effects of livestock on deer were likely overshadowed by the tremendous level of habitat disturbance that took place between 1849 and the early 1900s. There was likely enough early- to mid-successional habitat available that livestock and deer did not significantly compete. Since that time, the acreage and quality of deer habitat has declined to the extent that cattle and deer may now be competing for resources on summer ranges in mutually preferred meadow-riparian and aspen habitats (Loft et al. 1989); on winter and spring-fall ranges characterized by declining hardwood resources and shrinking forest openings (west side of Sierra and Coast Ranges) (Bronson 1992); and on winter range shrub communities (east and west side of Sierra Crest, Coast Ranges) (e.g. Longhurst et al. 1977). The decreasing role of fire and logging as mechanisms for creating early successional habitat in forested ranges indirectly results in greater potential for competition between deer and cattle on remaining ranges.

On east side shrub/grass ranges, continuous season-long grazing has been the primary grazing system in effect for decades. This strategy provides little chance for desirable herbaceous and shrub vegetation to rest and recover from grazing/browsing (e.g., Hormay

1943). The browse that livestock consume during spring and summer at the lower elevations is not present when deer need it during winter.

Grazing by cattle in the spring and summer on deer winter ranges may have a negative impact on browse availability the following winter. Cattle may also directly compete with deer for mast crops during fall and winter (Leach and Hiehle 1957). Barrett (1982) reported that cattle excluded deer from preferred oak-woodland habitat, and suggested negative social interactions were detrimental to deer.

Key habitats where livestock and livestock grazing can negatively impact deer habitat:

- Aspen
- Mountain meadows and montane riparian zones
- Great Basin and Desert ranges- riparian, springs, seeps, and meadows
- Hardwoods and associated "west slope" shrub communities
- Great Basin shrub/grass communities (sagebrush, bitterbrush, mountain mahogany)

Recognizing the Role That Private Lands Have in Affecting Deer Habitat

Susanville, Bishop, Reno, Santa Rosa, Auburn, Paso Robles, or the San Diego area all are examples of California's intrusion with houses, subdivisions, or other permanent development on California's wildlands. As it affects deer, much of the development occurs on winter range areas on either side of the Sierra Nevada or year-round range in the coastal mountains. As we proceed with development on private lands, the remaining public lands administered by the BLM and USFS are becoming increasingly important as our sustaining habitats for deer and other wildlife. It is becoming more important that these public lands be able to support the diverse habitats and successional processes that wildlife depends on.

The necessity to suppress fire at the urban-wildland interface, as well as attempts to reduce fuels through prescribed fire suggests that these lands will not be managed for their potential value as deer habitat. The same applies to private forest lands with specific objectives related to timber production. Deer and deer habitat quality are not priorities. Because of the private land objectives, our public lands are increasingly being relied upon to sustain deer, and management strategies on these public lands should better reflect multiple use management.

Many private lands are, and will remain, wildland. Additional efforts by the Department as well as BLM and USFS should be encouraged to provide assistance and incentive to private landowners to maintain high quality deer habitat, or enhance habitats through manipulation. The Enhancement and Management of Fish and Wildlife and their Habitat on Private Lands (PLM) program is an example of providing an economic incentive to maintaining deer habitat.

California's wildland ownership pattern is important to the maintenance of the deer resource. First, public ownership virtually assures that a large amount of wildland will exist in perpetuity. In addition, these ownerships provide an extensive network of reserved lands

(e.g., parks and wilderness - approximately 12 million acres) where human activities are held to a minimum. Second, much of the private forest and rangeland is owned by timber companies, corporations, ranchers, and farmers where conversion to urban uses (nondeer habitat) will likely be resisted. Third, much of these private lands are protected by land zoning. For example, about 5.5 million acres of timberland is protected under Timberland Production Zone (TPZ), and 15 million acres is protected as open space under the Williamson Act.

In an ongoing effort to address projects that affect deer and other wildlife habitat, the Department provides input relative to wildlife habitat protection into County General Plans and planning documents of the USFS, BLM and other agencies. Information is provided on deer habitat, including locations of critical seasonal ranges and migration routes for migratory deer herds. Information is also provided on how best to manage timber and rangelands to benefit deer.

In addition, the Department provides comments and recommendations on documents prepared prior to implementation of various types of projects, as required by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The comments are intended to make certain that effects of a proposed project on the affected wildlife populations (including deer) are accurately presented, and that alternatives to mitigate effects are presented. Each year, the Department provides comments on several thousand environmental documents for planned projects or permits.

WILDFIRE

Wildfire has always played an important role in the ecological balance of California's wildlife habitats. Because of the State's Mediterranean climate, wildfires can be a common annual occurrence, particularly from August to October. The extent and intensity of these fires varies greatly, depending upon the annual variation in weather. Since 1983, an average of about 359,000 acres has burned in California each year. Acres burned by wildfire for the past 20 years are listed in Table 3-1. The majority of these acreages were within deer habitat. As previously described, the impacts on deer vary, depending on location and habitat.

PRECIPITATION PATTERNS

California's "Mediterranean climate" is typified by hot, dry summers and cool, wet winters. Drought (below average precipitation) is a relatively common occurrence (annually in summer) and can range in severity. Historically, precipitation patterns have been extremely variable throughout the State. The Department of Water Resources annual water supply outlook (California Department of Water Resources 1986 + updates) is consulted to get an idea of weather severity by deer hunt zone.

Table 3-1. Acres of Wildfires in California - 1983 through 2002	
Fire Season	Acres Burned
1983	128,000
1984	251,000
1985	595,000
1986	119,000
1987	873,000
1988	345,000
1989	173,400
1990	365,200
1991	44,200
1992	282,745
1993	309,779
1994	526,219
1995	209,815
1996	752,372
1997	283,885
1998	215,412
1999	499,425
2000	295,026
2001	372,506
2002	538,216

Source: Wildfire Activity Statistics, various years. California Department of Forestry and Fire Protection.

Although wildfires can occur in every habitat, they are most prevalent in shrub/chaparral communities. However, as evidenced by the tremendous wildfire year of 1987 (873,000 acres burned), many acres of forest land can be affected. The total acres of wildfire, as a proportion of total deer habitat in the State, affects less than one percent annually.

The recent drought period of 1987-1992 was particularly significant, and may have contributed to declining deer numbers in several areas of the State, most notably,

northeastern California. Precipitation patterns are often localized. For example, during 1992, precipitation was only 75 percent of normal in the central Sierra, while rainfall was well above normal in southern California. The State is divided into hydrologic regions for more specific information on precipitation and runoff (California Department of Water Resources 1986). Conditions of drought are considered when developing the proposed project.

DISEASES AND PARASITES

Diseases and parasites are common in deer. However, significant mortality due to diseases and parasites is infrequently seen in California deer populations. The most significant documented mortality event took place following the identification of Foot and Mouth Disease (FMD) among the deer population in a section of the Stanislaus National Forest, Tuolumne County, in 1924. It was suspected that FMD had spread from affected cattle in the forest area to the deer. Subsequently, greater than 22,000 deer were slaughtered in efforts to eradicate the disease (some estimate up to 40,000 deer were slaughtered; Leopold et al., 1951). More than ten percent of the carcasses examined exhibited gross lesions suggestive of FMD. Complete recovery of the deer population was reported to have been achieved in less than 10 years. The heavy mortality experienced in this deer population was related to disease, but was the direct result of the FMD eradication program.

Chronic Wasting Disease

Recent concern has grown about effects of Chronic Wasting Disease (CWD) on deer and elk in North America (Williams et al., 2002). CWD is a fatal, contagious transmissible spongiform encephalopathy disease infecting the brains of deer and elk. It has been diagnosed within numerous states and provinces of North America. The Department began a surveillance program in 1999 and has tested more than 850 California deer for CWD. All results to date have been negative. California is considered a low risk state for CWD; as game ranching of cervids is not allowed (except for fallow deer), and importing live cervids is severely restricted. CWD is not currently known to be naturally transmitted to humans or to animals other than deer and elk. On June 5, 2003, the Fish and Game Commission adopted regulations placing conditions on the importation of hunter-harvested deer and elk into California. It is likely that import restrictions will continue and that the Department will continue its CWD surveillance program until more is known about this disease.

Viral Diseases

Viral diseases have the ability to kill otherwise healthy deer. Numerous viruses which cause disease in deer have been identified. Bluetongue, epizootic hemorrhagic disease (EHD) and adenovirus hemorrhagic disease (AHD) are important deer-related viral diseases in California. It is speculated that major repeated die-offs in coastal and Sierra foothill areas during the 1940s, 1950s and early 1960s were actually caused by one or more of these viruses, rather than "foot rot," as was once assumed. ADH was first recognized as a disease in mule deer in 1993 when it was identified as a cause of mortality in deer populations in the coast range and the west slope of the Sierra Nevada. The majority of the mortality consisted

of fawns, with a lesser number of adults affected. Mortality estimates were fewer than 1,000, however, due to the difficulty in documenting mortality in free-ranging deer, the number of affected deer is unknown. Sporadic mortality due to AHD has occurred since the 1993 epizootic, with an increase reported in 1998. Presently, both the short-term and long-term effects of these hemorrhagic diseases are not understood. Small die-offs probably go undetected each year.

Papillomatosis (cutaneous fibroma) is caused by a virus and consists of hairless, wart-like growths on the skin of infected deer. Papillomatosis, although rarely causes clinical disease, is worrisome to hunters and creates a blemish on the hide.

Other viral diseases, to which deer are susceptible but rarely diagnosed, include: bovine viral diarrhea, malignant catarrhal fever, infectious bovine rhinotracheitis, rabies and vesicular diseases.

Bacterial Diseases

Salmonella bacteria (includes hundreds of different serotypes) can cause an intestinal and/or systemic infection in a wide variety of animals, including deer. Salmonellosis outbreaks have been occasionally reported in free-ranging fawns and fawns maintained at wildlife rehabilitation centers suggesting that these bacteria could be a significant cause of mortality, especially in areas of high deer density.

Serologic evidence indicates that the Lyme disease agent, *Borrelia burgdorferi*, is widespread in deer in the coast range and on the west slope of the Sierra Nevada. Deer become naturally exposed to the disease agent by ticks, however, there is no evidence of clinical disease or lesions in exposed deer, or exposure of humans to Lyme disease by handling of the carcass or by consumption of venison from exposed deer.

Leptospirosis, caused by the bacterium *Leptospira interrogans*, is responsible for subclinical disease and sporadic mortality of deer. Many animals can serve as reservoirs of leptospirosis and can shed the leptospire organism in their urine for long periods of time. Leptospirosis is transmitted through exposure of the mucous membranes (nasal passages, conjunctiva) to contaminated drinking sources, pastures, and food. Leptospires can survive for long periods in warm, moist areas. Leptospirosis in deer is more frequently diagnosed during years of high precipitation.

A variety of disease processes, such as abscess, joint infection, and septicemia are caused by bacteria commonly associated with deer, *Actinomyces* (formerly called *Corynebacterium*), *Streptococcus, Staphylococcus,* and *Pasteurella multocida*. *Actinomyces pyogenes* is the most frequently isolated bacteria in abscesses identified in deer. Sporadic mortality is seen associated with these disease processes.

Other bacteria known to cause infrequent disease and mortality in California deer are *Mycobacteria paratuberculosis, Mycoplasma spp.*, and *Clostridium spp.* (blackleg, malignant edema).

Parasites

A wide variety of external and internal parasites can be found associated with deer in California. Healthy deer generally tolerate parasites remarkably well.

External parasites include lice, fleas, ticks, deer keds and nose bots. Tick species which most frequently parasitize deer in California include *Dermacentor spp.* and Ixodes spp. Deer tolerate ticks remarkably well unless they are malnourished and heavily parasitized. An occasional case of "tick paralysis" has been reported in deer. Deer keds (louse fly; *Lipoptena spp.*) are the most common external parasites found on deer and have little to no impact on deer health. Nasal bots (*Cephenemia spp.*) are commonly found in deer nasal passages and pharyngeal pouches. They do not appear to affect the deer's health. Other lesser observed external parasites include: lice, ear mites, mange, ringworm, and eyeworm (*Thelazia californiensis*).

Internal parasites which can be found in deer include:

- Arterial worm (*Elaeophora schneideri*) is a nematode that occurs naturally in mule deer and generally is not associated with clinical disease.
- Lungworms (*Dictyocaulus* spp.) are found in the lung airways and, if present in great numbers, can cause clinical disease and mortality (verminous pneumonia) primarily in yearling deer during the spring and summer.
- Stomach worms (*Haemonchus contortus, Ostertagia spp.)* can cause mortality in areas where deer exceed the carrying capacity of the habitat and are found in association with malnutrition.
- Abdominal worm (*Setaria spp.*) is a nematode found in the abdominal cavity of deer; and is not pathogenic to deer, but may alarm hunters.
- Larval tapeworms (larval stage of *Taenia hydatigena* and *Echinococcus granulosus*) are bladder-like structures containing a scolex and may be present in the abdomen attached to the surface of the visceral organs or embedded in the lungs; these larvae are not pathogenic to deer.
- *Sarcocystis spp.*, a protozoan, can be found in the muscle tissue as cysts (0.5-3mm) and are not pathogenic to deer.
- Intestinal nematodes commonly found in deer include *Trichostrongylus spp.* and *Nematodirus spp.* and are not commonly associated with mortality in deer.
- Liver fluke (*Fasciola hepatica*) can be found in bile ducts within the liver and can occasionally cause mortality if a severe infestation occurs.

CHAPTER 4. ENVIRONMENTAL EFFECTS OF THE PROPOSED PROJECT

This chapter contains an analysis of the proposed project on the environment. Many sources of information and various data analysis techniques were used by the Department to determine the environmental effects of the proposed project. Appendix 7 describes the data elements, data collection, and data analysis techniques. Based on the following analysis, the Department believes the proposed project would not cause any significant adverse environmental effects.

EFFECTS OF HUNTING ON INDIVIDUAL DEER HERDS OR GROUPS OF HERDS

Hunting results in the death of individual animals, but is regulated to prevent negative effects on populations. In certain instances, hunting mortality can benefit the population by increasing survival of young animals and lowering the average age of the deer (McCullough 1979, Kie *et al.* 1980, Skogland 1986, May and Seger 1986).

The concept that there can be a sustained yield from an animal population and that mortality from hunting will be compensated for by reduced mortality from other causes is often referred to as "compensatory mortality" (Peek 1986). Much information exists in published literature demonstrating that deer populations display compensatory mortality. Connolly (1981) provides an extensive discussion (and citations to some of the most pertinent literature) of the concepts of harvestable surplus and compensatory mortality.

Although compensatory mortality has been shown to exist in deer populations in most circumstances, recent information has shown that this may not always be the case (Mackie et al. 1998). Wood *et al.* (1989) found, in studying both white-tailed and mule deer, that fawn survival did not increase at high harvest levels in a mixed prairie environment in eastern Montana. It should be noted that this study involved high harvest rates for males (58 percent for mule deer and 31 percent for white-tailed deer), as well as for females (21 percent for mule deer and 31 percent for white-tailed deer). As discussed below, most harvest rates in California are well below this level, since only bucks may be taken in most areas and, where antlerless hunts are held, a much lower proportion of the population is removed than in this study.

It has been found that some deer herds can sustain high rates of harvest, while others cannot (Wallmo 1981). In addition, hunting only bucks tends to maximize deer population size (Anderson, F.M. *et al.* 1974). Unregulated hunting can reduce or eliminate deer herds. However, there is no evidence that regulated hunting has been the cause of a population decline over any large area within the last 60 years. In stable populations, mortality equals recruitment. Consequently, stable deer populations are characterized by hunter take, together with nonhunting mortality, being equal to fawn recruitment. However, when carrying capacity increases due to favorable range conditions or direct habitat manipulation, fawn recruitment will increase irrespective of adult hunting mortality (Kie and White 1985).

Because the effects of hunting on deer numbers is unique to a specific deer herd or management unit (hunt zone or area), each is evaluated independently in this chapter. The effects of hunting on deer populations vary with the intensity of the take and the degree to which the population is limited by forage. Because deer herds in California are generally limited by forage availability during some portion of the year, deer numbers will vary with the capability of the habitat to supply that forage.

During the annual cycle, fawns are added to the adult population in the late spring/early summer. Because an average of 1.5 fawns are produced by each doe (approximately half of the does produce twins) and about two-thirds of the population is comprised of does, the population size nearly doubles in late spring/early summer. Most of these fawns will die of natural causes during the first year of life, and only enough will survive to replace adult deer that died during the previous year. If there are new or improved habitat conditions to support additional animals, a proportionate number of fawns will be sustained (Skogland 1986, Kie and White 1985, and Van Horne 1983).

The effects of hunting can be determined by assessing the proportion of sex and age classes of deer in the hunt area after the hunt and prior to spring. As greater or fewer numbers of animals are taken from the population each year by hunting, the sex and age composition of the herd changes. This change is commensurate with the hunting strategy. When adults are killed and removed from the population, more fawns survive to adulthood. This occurs because forage that would have been consumed by the adults is available to the fawns.

The predominantly buck-only hunting strategy in California removes five to seven percent of the total deer population (Connolly 1981, Anderson, F.M. *et al.* 1974, and Dasmann 1952). This level of harvest means that 30-80 percent of the adult bucks are removed from the population annually. Because bucks comprise only 10-15 percent of the total deer population, the effect of the hunt on the local deer population is negligible over the annual cycle, and the population size is not affected, as fawns are recruited into the population to replace the adults that are killed.

Where antlerless and either-sex deer are hunted, less than one percent of the adult does are generally taken. Because does comprise 60-90 percent of the herd, the effect of these hunts on the local deer population is small. The hunt may reduce the local post-season population size by a small percentage, relative to the preseason population. The additional annual loss of deer due to these hunts is replaced by surviving fawns during the next late spring/early summer.

The effects of the hunting proposals have been determined using the KILLVARY Model (see detailed description in Appendix 5). The primary input to the model for this analysis was the actual deer herd composition survey data and expected hunter harvest (including PLM Program hunter harvest), based on historical take. To ensure that the total effect of the proposed project is predicted accurately, other known sources and levels of deer mortality are included into the model. Therefore, estimates of unreported legal harvest (see Chapter

1), crippling loss and deaths due to nonhunting factors (e.g., starvation, predation, poaching, depredation take, etc.) have been made part of the model. These estimates are based on the information presented in the approved deer herd management plans, which reflect expected levels of these mortalities.

The following table (Table 4-1) lists the values for important deer population parameters that describe the effects of the proposed project on deer populations in each deer hunting zone in California. All hunts within each zone were combined to evaluate these effects. This includes all deer harvested during the general season (including Section 554 harvest), archery season, area-specific archery, additional, fund-raising, or PLM hunts, if any. The effects of any additional and area-specific archery hunts were evaluated by comparing the effects with and without those hunts. The effects of any fund-raising tag hunts were assumed to be immeasurable because the number of such tags is limited to a total of ten. The deer harvest and herd composition data presented in Chapter 1 are used below. The population modeling results are estimates. Please refer to Table 1.1 for zone-specific reported and estimated harvest, buck ratio objectives, buck and fawn ratios, and the three-year average population estimate.

Computer simulation modeling (KILLVARY Model) reveals that the increased harvest through PLM, additional, fund-raising, and area-specific archery hunts in the deer zones will not affect total population size or significantly affect buck ratios.

EFFECTS OF HUNTING ON CONDITION AND SEX RATIOS OF DEER

Hunting mortality of deer in California is too low to have significant effects on the productivity of deer populations as measured by annual deer herd composition survey data. However, hunting can be expected to change the age class structure (particularly males) of deer populations. The effect of the proposed hunts will only be on local populations, because deer in hunting zones, area-specific archery hunts, and additional hunts are independent from other zones and additional hunts.

The following sections describe the effects of bucks-only, antlerless and either-sex deer hunting on the condition and sex ratios of deer populations.

A, B, C, D, AND X ZONES, AREA-SPECIFIC ARCHERY, ADDITIONAL, PLM, AND FUND-RAISING BUCK HUNTS

Generally, bucks are predominantly hunted in zones A, B, C, D, and X zones and most area-specific archery, additional, PLM, and Fund-raising hunts. This hunting strategy removes about 30-80 percent of the adult bucks from the population, which comprise only 10-15 percent of the population. Therefore, overall, buck hunting results in the harvest of five to seven percent of the total population. No significant change in herd condition is expected from this level of harvest because too few animals are being removed from the population (see "Compensatory Mortality and Recruitment").

Table 4-1. Effects of Proposed Project on Deer Populations by Deer Hunting Zone										
Zone	Estimated 2003 Hunter Take				Population Modeling Results-Population Data					Additional, Area-Specific Archery, and PLM Hunts
	Bucks	Does	Total	All Hunting Mortality	Population Size	% Lost to Non-hunting Mortality	% Lost to Hunting Mortality	% of Annual Yield Killed Legally		
								Bucks	Does	
A	9,451	170	9,622	11,545	145,520	15.6	7.9	64	0.24	G-8,G-9, G-11, G-21, MA-1, MA-3, J-1, J-10, A-24, A-25, A-32 and seventeen PLMs
B-1	2,844	15	2,859	3,431	57,960	14	5.9	34	0.042	M-11, A-30 and ten PLMs
B-2	2,397	0	2,397	2,876	40,580	16	7.1	48	0.01	J-4 and one PLM
B-3	546	0	546	655	9,850	15.5	6.6	41	0	None
B-4	509	0	509	611	9,450	16	6.5	40	0	None
B-5	569	0	569	683	10,380	17.1	6.6	37.5	0.1	Five PLMs
B-6	1,057	0	1,057	1,268	16,700	17	7.6	53	0	None
C-1	263	0	263	316	2,800	18.7	11.3	100	0	A-1 and two PLMs
C-2	251	0	251	301	3,070	19.3	9.8	100	0	A-1
C-3	385	0	385	462	7,500	45	6.1	51	0.06	A-1 and three PLMs
C-4	1,126	0	1,126	1,351	16,380	19	8.2	61	0.6	G-1, J-3, J-21, A-1 and two PLMs
D-3	992	27	1,019	1,223	14,830	19	8.2	59	0.35	G-7, G-12, J-8, J-9, J-16 and one PLM
D-4	248	7	255	306	3,670	20	8.3	60	0.4	G-19 and J-17

Table 4-1. Effects of Proposed Project on Deer Populations by Deer Hunting Zone										
Zone	Estimated 2003 Hunter Take				Population Modeling Results-Population Data					Additional, Area-Specific Archery, and PLM Hunts
	Bucks	Does	Total	All Hunting Mortality	Population Size	% Lost to Non-hunting Mortality	% Lost to Hunting Mortality	% of Annual Yield Killed Legally		
								Bucks	Does	
D-5	1,774	13	1,787	2,144	26,990	19	7.9	58	0.1	J-18
D-6	1,096	0	1,096	1,315	21,820	18.5	6.0	31	0	G-37, A-21 and J-15
D-7	1,001	2	1,003	1,204	12,100	22	10.0	100	0	None
D-8	444	0	444	533	6,550	16.5	8.1	71	0	G-6
D-9	141	0	141	169	2,070	19	8.2	60	0	None
D-10	134	47	181	217	2,380	11	9.1	44	2	One PLM
D-11	251	26	277	332	3,440	18	9.7	64	1.7	A-31 and J-13
D-12	114	0	114	137	1,680	19	8.2	60	0	None
D-13	225	15	240	288	2,700	18	10.6	100	1.15	M-7
D-14	139	3	142	170	1,610	22	10.6	100	0.5	J-11 and one PLM
D-15	148	115	263	316	1,600	13	19.8	79	15.9	G-10 and one PLM
D-16	160	51	211	253	1,760	21	14.4	100	6.8	G-13, M-6 and A-22
D-17	68	0	68	82	1,000	19	8.2	60	0	None
D-19	65	1	66	79	950	19	8.3	60	0.3	J-14
X-1	449	0	449	539	5,230	22	10.3	100	0	A-3 and one PLM
X-2	55	0	55	66	600	26	11.0	100	0	M-9, A-4, A-27 and one PLM

With the data available, we cannot determine whether large bucks are declining as a proportion of the buck population over time, although it does appear that the percentage of large bucks harvested has remained stable over the past 50+ years. Large antlered bucks are successfully harvested each year, but deer do not necessarily reach large-antlered status in one year and not all the large-antlered bucks are taken, hence there are large-antlered bucks present during the breeding season each year. They are the bucks that have successfully eluded all natural enemies, including hunters.

2. **Do Large-Antlered/Large-Bodied Bucks Do All the Breeding and Are They the Fittest Individuals?**

Approximately 50 percent of fawns born in California die within the first two months of life (Salwasser *et al.* 1978) and another 25 percent will not survive the winter. About 20-30 percent of all fawns born survive to be recruited into the population and possibly pass on genetic material (approximately 50 percent of which are males and 50 percent females).

Because large bucks are involved in most of the breeding, by definition they are generally the most fit individuals. However, these bucks have the same genetic material when they are young as they do when they are mature or old. Even if all the large-antlered bucks could be harvested each year, their genes would persist in that they would have engaged in breeding in years prior to being harvested.

Additionally, there is concern from the public that hunting during the breeding season or "rut" disproportionately and significantly results in the death of large bucks because they are less wary and, therefore, more vulnerable to the hunter.

The deer tag return data indicate most bucks taken are in the two- and three-point class. It is doubtful hunters can selectively pick those two- and three-point bucks that would have the highest genetic fitness in this class. The Department assumes those that survive to be large-antlered deer may be most fit and pass on their genetic material each year that they are alive.

3. **Are Genetically Inferior Bucks Breeding Female Deer and Is the Population Regressing In Genetic Fitness?**

Evidence that genetically inferior bucks are breeding would be reflected in physiological and morphological characteristics that impact survival and reproduction of deer. For example, tule elk in California were nearly extinct in the early 1900s and have since successfully recovered. However, during the period of extremely low populations, inbreeding is thought to have been prevalent and partially responsible for the genetic defect called Brachygnathism (undershot jaw) (David A. Jessup, California Department Fish and Game, memorandum dated October 17, 1980). Fawn production and survival would be expected to continually decline as "less fit" deer that are not as efficient at securing food or avoiding predators are brought into the population. Yet fawn production varies up and down over the years in any given herd and appears to be highly correlated with range quality (Longhurst *et al.* 1952). The overall population

would be expected to decline relative to habitat carrying capacity, thereby alleviating deer browsing pressure on limiting ranges--this has not happened.

This question assumes the doe has no part in determining which buck ultimately breeds with her. Geist (1981:196) describes how it is in the best interest of the doe to "...be bred by the most dominant male so as to maximize her chances of producing equally competent sons...the doe must possess a mechanism whereby as many males as possible are attracted...so that only the most dominant remains by the time the female is receptive." Breeding is generally accomplished by a very few dominant bucks (Dixon 1934). Dominance is expressed in terms of stamina and strength, as well as antler size and body size; hence, even if most of the "large" bucks are harvested, there remains enough of a pool of bucks to compete for breeding. Among them would be the up-and-coming dominant young males that have not achieved large-antler status.

Geist (1990) describes two strategies large bucks can elect to pursue during the breeding season. The first is to participate in the rut, sparring with other more or less dominant bucks to have the opportunity to breed, or alternatively, to sit out the rut and maintain fat reserves while other bucks deplete their reserves. This second strategy then becomes important during severe winters that remove the weakened rutting bucks from the population, thereby enabling the buck that chose to "opt-out" of the rut to breed with little competition from other large bucks for up to several years thereafter.

The Department would be concerned if localized heavy hunting pressure eliminated all the large bucks. If this were to happen, we would expect erratic breeding resulting in late or weakling fawns (e.g., Dixon 1934). Annual monitoring of fawn recruitment and timing of fawn drop are conducted to detect whether corrective action is needed. Currently, range quality appears to be the factor most limiting fawn survival (Salwasser *et al.* 1978, Loft *et al.* 1991).

Therefore, despite hunting: (1) a proportion of large bucks remain; (2) breeding is primarily done by a few dominant bucks; and (3) young bucks also successfully breed.

4. **Do Female Deer Contribute to the Genetic Makeup of Male Deer?**
Adult female deer obviously contribute to the genetic makeup of their offspring. The "fittest" females should produce the most surviving young deer, male or female. However, we do not know how much the female contributes to the large antler and body size of buck deer. Females may even possess a gene that could express large antlers in their male offspring because it would enhance her genetic fitness as well (e.g., Dawkins 1976).

5. **Is Large-Antler Growth and Large Body Size Dominated by Genetic Rather Than Environmental/Nutritional Factors?**
This question is somewhat confounded in that larger deer should be able to obtain higher quality forage than inferior deer. However, we do know food intake and quality significantly influence body size in species such as humans, domestic livestock, and

deer irrespective of genetic background. Deer ranges in poor condition result in deer in poor condition, regardless of their genotype.

The effects of very high levels of hunting on deer in the mid to late 1800s and during a hoof-and-mouth disease outbreak in the Stanislaus National Forest in 1924 are excellent examples of potential genetic consequences of heavy hunting pressure. Deer responded to these profound population reductions during the 1800s to achieve their highest numbers in recorded history during the 1950-1970 period. Killing of the diseased Stanislaus deer in 1924-1926 (Leopold *et al.* 1951) simulated heavy hunting pressure. Over 20,000 deer, both male and female, were killed in a year, yet the population recovered completely within 10 years. These examples indicate deer in California can sustain much higher harvest than is currently authorized by the Commission, with no apparent deleterious impacts.

It is the Department's conclusion the genetic potential for large-antlered, large-bodied deer is present and vigorous. However, it is not seen as often under current management actions that have chosen to allow hunters to harvest such deer rather than leave them in the field. The Yosemite Deer Herd is an excellent contrast with other herds because it is managed for a high buck to doe ratio (35-45 bucks per 100 does) for viewing of large bucks in the Yosemite National Park.

Concern about genetic variability in large mammal species occurs primarily for species having small, isolated populations that are potentially in danger of extinction through factors such as habitat fragmentation, disease, and inbreeding. Such species include the black rhinoceros (*Diceros bicornis*) which has approximately 3,800 animals in the wild, occurring in about 75 populations of which only 10 have more than 50 animals (Ashley *et al.* 1990) and bighorn sheep (*Ovis canadensis*) (Berger 1990).

Berger (1990) modeled the persistence of bighorn sheep populations of various sizes based on historical records of actual populations. The study revealed that populations having more than 101 individuals did, or could, successfully persist, while populations of less than 101 would generally be extirpated in 50 to 60 years. Clearly, California deer herds, that number into the tens of thousands of animals, with extensive mixing of subpopulations, do not warrant the concern over genetic variability that these isolated species warrant.

EFFECTS OF HUNTING ON SOCIAL STRUCTURE OF CALIFORNIA DEER

The timing of deer hunting seasons varies among zones and special hunts. The majority of hunts begin in late summer and continue into early fall. Typically, they begin prior to the breeding season with some extending into the rut. Most deer in California breed from late October until mid December, with a few exceptions, such as the southern desert where breeding may take place in late January.

During fall, adult female deer are coming off the summer range to the winter range with their current offspring and possibly offspring females from previous years in maternal family groups (e.g., Taber and Dasmann 1958). These groups may include yearling bucks as well, but generally the older bucks (more than two years of age) will be on their own or with a few similar age-class bucks. The mature bucks are usually on their own, or in small groups prior to the breeding season. Hunting at this time of the annual life history of deer is not likely to have any impact on these particular social groupings.

Antlerless hunts during this time could result in the death of maternal deer, leaving their fawns unattended. However, many females will have already lost their fawns to natural causes by this time. Additionally, fawns are typically weaned by late August and not dependent upon the doe for survival. Hunting proposals that include antlerless take have been historically set later in the season to avoid the harvesting of females with dependent fawns. The primary basis for initiation of game regulations in the early 1900s was to protect the female and her offspring.

Some deer hunts extend into the breeding season, which may have implications on social behavior and activities. Dominance order is apparently established prior to females coming into heat (Geist 1990). At this time, the dominant bucks repel subordinate bucks, including large ones that drift throughout the range (Geist 1990). If a dominant buck died or were killed at this time, he likely would be replaced by another who would establish dominance in the same area. Overall, the impacts of hunting are not expected to significantly affect the social structure of deer populations. This is evidenced in part by continued high reproductive rates in females from year-to-year and above historical population numbers in the presence of 100+ years of hunting.

EFFECTS OF HUNTING ON NATURAL MORTALITY

It is commonly held by wildlife biologists that hunting mortality is largely offset by compensatory decreases in natural losses (Connolly 1981, Peek 1986).

The compensatory mortality detected in field studies has been simulated with some success (Connolly 1981). Anderson, F.M. *et al.* (1974) showed survival of fawns is higher with either-sex hunting than with no hunting or buck-only hunting. Natural losses due to severe winters, predation, disease, etc., are lower when does are killed than when no deer or only bucks are harvested. Antlerless and either-sex hunting temporarily reduces the population below its carrying capacity, stimulating a higher rate of fawn survival. This generally results in the population recovering from hunter-induced mortalities by the following hunting season.

The Department's deer management program ensures deer herds are maintained for the following reasons: (1) harvest rates are prescribed to achieve buck ratio objectives; (2) harvest rates are controlled by hunt zone quotas; and (3) annual deer herd assessments are conducted in each hunt zone to determine sex and age ratio and annual recruitment (i.e., survival). Under the conditions proposed by the projects (as discussed in Chapter 1),

hunting mortality is not expected to produce an additive effect in any of the A, B, C, D or X zones or in any of the additional hunts.

EFFECTS OF OFF-HIGHWAY VEHICLES AND OTHER HUMAN DISTURBANCE

Deer are exposed to many sources of disturbance by humans. The responses to these disturbances can be classified as: immediate - an initial behavioral or physiological response of short duration; protracted - a response that lasts longer than an immediate response and results in changes in the behavior or distribution of deer that allow it to adapt to a particular situation; reproductive - a response that results in a decrease in the reproductive capability of deer, including changes in fawn production or fawn survival.

The immediate response of deer to disturbance has been determined by measuring flight distances, changes in heart rates, and estimating energy expenditures. Flight distance is defined as the distance to which a person or vehicle can approach a wild animal without causing it to flee (Altmann 1958). The threshold distance for flight in deer increases in hunted populations (Geist 1971, Dorrance et al. 1975, Ward et al. 1980, Yarmoloy et al. 1988) when there is less vegetative cover between deer and people (Ward et al. 1980) and during the time the fawns are highly dependent on does (Altmann 1958).

The flight responses of deer have been determined by analyzing responses to people on foot, four-wheel-drive pickup trucks, snowmobiles, and all-terrain vehicles.

In Colorado, wintering mule deer disturbed by snowmobiles and people on foot did not flee when people on foot remained greater than 191 meters away or when snowmobiles were more than 133 meters away (Freddy et al. 1986). Mule deer and white-tailed deer fled more frequently from people on foot than from snowmobiles (Freddy et al. 1986, Eckstein et al. 1979). Ward et al. (1980) noted that mule deer fled when people on foot were within 200 meters of mule deer.

Mule deer showed few flight responses when four-wheel-drive pickups were more than 100 meters away from them at the El Dorado National Forest. When the vehicle was less than 50 meters from the deer, 56 percent of the responses resulted in flight (U.S. Forest Service 1987).

The flight response of mule deer purposefully harassed by riders on All Terrain Vehicles (ATVs) has also been determined (Yarmoloy et al. 1988). In two trials before they were harassed by ATVs, mule deer fled 41 percent and 11 percent of the time when ATVs were within 250 meters of the deer. After being harassed by ATVs, mule deer fled 80 percent of the time when ATVs were within 250 meters.

Heart rates of deer were monitored to determine their response to various types of human disturbance (Ward et al. 1980). Heart rates of deer increased in response to moving vehicles. However, heart rates increased more in response to people outside vehicles than when people remained in their vehicles.

Each time deer fled from people on foot, they expended an estimated 2 to 4 percent of their daily metabolizable energy. Each time deer fled from people on snowmobiles, they expended 0.4 to 0.8 percent of their daily metabolizable energy (Freddy et al. 1986).

Protracted responses include changes in activity patterns, avoidance of disturbed areas within a deer's established home range, changes in home range size, or changes in habitat use.

Daily activity patterns of deer have been monitored in response to different levels of motor vehicle use. Responses differed between unhunted and hunted populations of deer.

Activity patterns of unhunted deer populations did not change between periods of high and low Off Road Vehicle (ORV) or snowmobile use (Ferris and Kutilek 1989, Dorrance et al. 1975). When an unhunted population of mule deer was harassed by ATV users, the does avoided harassment by feeding earlier and later than unharassed does (Yarmoloy et al. 1988).

A hunted population of white-tailed deer was monitored for two consecutive days of no snowmobile use and two consecutive days of high snowmobile use (Dorrance et al. 1975). Deer moved significantly greater distances during days of high snowmobile use compared to days of no snowmobile use. However, the surveyors concluded that the response was temporary because the distance between locations during the night remained essentially unchanged between the different levels of snowmobile use.

Activity patterns of white-tailed deer in Wisconsin were also monitored during different levels of snowmobile use. Intensive snowmobiling caused a significant increase in deer activity during a period of the day when deer were normally inactive. However, because of the radiotelemetry system used in the study, it was not known if the change in activity was attributable to animals walking around or merely moving their heads while lying down (Eckstein et al. 1979).

In a study in central California, black-tailed deer avoided an ORV park or used denser cover on weekends during peak ORV use (Ferris and Kutilek 1989). During midweek, however, deer returned to the park and used habitats with less cover. No significant differences in home range size were found between black-tailed deer that inhabit the ORV park and black-tailed deer that did not occur in ORV parks (Ferris and Kutilek 1989).

In a study on the west slope of the Sierra Nevada near Georgetown, California, no statistically significant differences were detected in the size of two-day activity centers or the amount of feeding time among differing levels of ORV use (Jones & Stokes, 1991). However, due to low sample size, poor telemetry location data, and equipment failure, if real differences had occurred, they may not have been detectable. It was concluded that: (1) the deer were not affected by the ORVs because no trends in the data existed to suggest otherwise; (2) the total amount of time that deer foraged and the daily cycle of feeding

periods were similar to other populations of deer that had not been disturbed by ORVs; (3) there was a low probability of an ORV encountering a deer because of the low population densities and large home ranges in the study area; and, (4) the noise from the ORVs was shielded by the vegetation and terrain and restricted in time and space. In addition, no significant differences could be detected in the size of two-day activity centers or the distance of deer from roads and trails for three levels of non-ORV recreation (hikers, equestrians, and mountain bike riders). The study concluded that low to moderate levels of ORV use at Rock Creek should not have significant effects on pregnant does because of the infrequent encounters between deer and ORVs; however, high levels of ORV use may have an effect on pregnant does and could influence neonatal mortality.

Livezey (1988), as a result of his study on black-tailed deer in the Northern Mendocino National Forest of California, recommended that "many smaller roads be closed and off-the-road vehicular travel be prohibited during the buck hunting season in order to lessen doe mortalities, disturbances of deer family groups, and new roading." These recommendations were based on the fact that deer with activity areas within 200 meters of an active dirt road were displaced from that habitat.

In Colorado, the density of mule deer pellet groups was substantially less within 200 meters of roads than areas farther from roads, suggesting that deer avoided roads (Rost and Bailey 1979). The study also indicated greater avoidance by deer of roads in shrublands than in ponderosa pine or juniper woodlands, which provided better hiding cover.

In California, Cornett et al. 1979, observed that deer use of a meadow near cabins was 40 percent of the use in a similar undisturbed site. They also observed a 70 percent decrease in deer use within 46 meters of hiking trails.

After deer were harassed for 24 days with an ATV, three does were located outside of their previously established home ranges 18 to 28 percent of the time (Yarmoloy et al. 1988). Does that were not harassed were always located within their established home ranges. In some instances, harassed does ran more than 1.5 kilometers beyond the boundary of their home range, a distance equal to the diameter of their home range. In one case, a doe stayed away from its home range for two days.

Limited data are available on habitat use by deer subjected to high levels of motor vehicle use. No significant differences in habitat use were observed in white-tailed deer subjected to different levels of snowmobile use (Eckstein et al. 1979). Habitat use by black-tailed deer did not differ significantly during heavy and light use periods of ORV use; however, the deer tended to use heavier cover during periods of high ORV use (Ferris and Kutelik 1989). Harassed mule deer spent significantly more time in hiding cover than unharassed deer (Yarmoloy et al. 1988). Low fawn production was associated with harassment by ATVs (Yarmoloy et al. 1988).

Hobbs (1989) used simulation modeling to estimate winter mortality rates of does and fawns under different disturbance levels. Daily disturbance substantially increased mortality in

does and fawns during severe winters because the forage was covered with snow for prolonged periods. However, mortality rates were not expected to increase substantially if disturbance occurred during mild winters when forage was available. Hobbs (1989) concluded that processes controlling energy expenditures were not as influential in determining deer mortality as processes controlling energy intake.

In a study on the North Kings Deer Herd in California, Bertram (1984) concluded that the proliferation of roads was deteriorating the values of some key deer areas and recommended seasonal and year-round road closures. He felt the increased traffic and the various human activities associated with this traffic were causing a rise in fawn mortality, a primary proximate cause of the decline in this deer herd. However, it was stated that "disturbance impact is directly related to adequacy of cover." The impacts of roads can apparently be reduced if sufficient roadside screening exists or can be established.

In a study of habitat use by mule deer in the San Bernardino Mountains, California, Nicholson and Bowyer (1994) found that human disturbance was a significant factor affecting this deer herd. Deer avoided riparian and meadow habitats because of the heavy human disturbance.

There is no question that human activity can affect deer. However, in the broad sense, it is not clear whether human activity has any significant adverse effects on deer populations. .

EFFECTS OF THE USE OF DOGS

Some members of the public feel using dogs is unsporting and are concerned with the health of deer populations as the result of their use. Hunters, which generally support the use of hunting dogs, feel their use is a traditional method of hunting which provides a better opportunity to kill and/or recover a deer. It is expected that eliminating the use of a dog would result in a loss of hunter opportunity, increase the number of unrecovered dead or crippled deer, increase the buck ratios in some areas, and reduce the stress of deer that might have otherwise been chased by a dog(s).

Hunter opportunity would be expected to decline because some hunters would no longer be able to use a dog to find and recover a deer. Using a dog to hunt deer is a technique that allows hunters to more efficiently locate deer. Studies indicate hunters using dogs have a higher success rate than hunters without dogs (Spencer 1986). In some areas, this lower success rate may result in higher buck ratios. However, because the number of hunters using dogs to hunt deer in California is believed to be small, it is doubtful such an effect would be realized.

A study on the effects of hunters with dogs on deer fertilization, reproductive, and survival rates found no significant effects and concluded the use of dogs in hunting deer does not appear to affect the reproductive potential of deer populations (Spencer 1986). However, they noted deer densities were lower in dog-hunting areas than no-dog hunting areas

(Spencer 1986). Because the study dealt with white-tailed deer under different management practices, its applicability to the situation in California is questionable.

There is evidence deer hunted with dogs experience higher levels of stress than those hunted without dogs (Spencer 1986). However, this higher stress did not appear to have any consequences to the reproductive potential of these deer populations (Spencer 1986).

Although dogs are believed to increase the recovery rate of deer killed or crippled, there is very limited data to evaluate whether or not using dogs lowers the number of deer killed or crippled that are lost.

EFFECTS OF PREDATION ON DEER POPULATIONS (Moved to Cumulative Impacts, Effects of Nonhunting Mortality)

EFFECTS OF HABITAT CONVERSION (Moved to Cumulative Impacts)

EFFECTS OF LAND MANAGEMENT ACTIVITIES (Moved to Cumulative Impacts)

EFFECTS OF WILDFIRE (Moved to Cumulative Impacts)

EFFECTS OF ADVERSE CLIMATIC CONDITIONS (Moved to Cumulative Impacts)

EFFECTS OF DEPREDATION TAKE (Moved to next page)

EFFECTS OF NONHUNTING MORTALITY (Moved to Cumulative Impacts)

EFFECTS OF THE COOPERATIVE DEER HUNTING (SECTION 554) AREA PROGRAM

Based on the small number of deer harvested on private lands permitted through the Cooperative Deer Hunting Area Program, Section 554 (see Chapter 2), no negative cumulative effects can possibly be attributed to the deer harvested on Section 554 areas. Deer harvest on the Section 554 areas has been incorporated within the X zone public harvest and used together with the PLM harvest to estimate the deer population in Table 1-1. Additionally, this harvest was considered by the Department when evaluating the effects of the proposed project and alternatives in Chapters 4 and 5, respectively. The extremely limited Section 554 harvest (2003 reported kill 32 bucks), together with the habitat maintenance and protection afforded through this program, suggest there has been no negative cumulative effect on deer populations. Rather, the protection and maintenance of important deer habitats have had a positive net effect on those deer herds.

During the population modeling process described in Chapter 5, the previous year's harvest together with other hunting and non-hunting mortality is used to estimate a deer population for the hunting zone. This population estimate is then used to evaluate the effects of the proposed project. Any additional Section 554 areas which may be permitted in the future are

evaluated and addressed through the establishment of the unallocated harvest buffer unique to each zone and its alternatives (Desired Kill, High Kill, and Low Kill).

EFFECTS OF THE PRIVATE LANDS WILDLIFE HABITAT ENHANCEMENT AND MANAGEMENT (PLM) AREA PROGRAM

Based on the small number of deer harvested on PLMs (see Chapter 2), no negative cumulative effects can possibly be attributed to the deer harvested on PLMs. Deer harvest on the PLMs has been used together with public harvest to estimate the deer population in Table 1-1. Additionally, this harvest was considered by the Department when evaluating the effects of the proposed project and alternatives in Chapters 4 and 5, respectively. The extremely limited PLM take and comparable (similar to the public harvest) antler class harvest described in Chapter 2, together with the habitat improvement and maintenance activities conducted on each area, suggest there has been no negative cumulative effect on deer populations. Rather, habitat improvements accomplished specifically for deer have had a positive net effect on those deer herds.

During the population modeling process described in Chapter 5, the previous year's harvest together with other hunting and non-hunting mortality is used to estimate a deer population for the hunting zone. This population estimate is then used to evaluate the effects of the proposed project and future PLM hunting. Additionally, future growth of the PLM Program is evaluated and addressed through the establishment of the unallocated harvest buffer unique to each alternative (Desired Kill, High Kill, and Low Kill).

EFFECTS OF DEPREDATION TAKE (2003 Document page 173)

Any owner or tenant of land that is being damaged or destroyed or is in immediate danger of being damaged or destroyed by deer may apply to the Department for a permit to take the offending animal(s). The Department, upon satisfactory evidence of damage, shall issue a revocable permit for taking a specific number of depredating deer. However, the Department may specify special conditions that must be followed during the execution of the permit.

Depredation permits issued by the Department are valid only on the property described in the permit and for 60 days after issuance. Deer of either sex may be taken under a depredation permit, and the permittee shall kill offending animals in a humane manner. Upon killing a deer, the permittee is required to tag the animal and submit the report card portion of the tag to the Department. Statutes that apply to the taking of depredating deer are described in Fish and Game Code sections 4181.5 and 4341. The specific regulation regarding the issuance of depredation permits is presented in Section 401, Title 14, CCR.

In 2003, approximately 96 depredation permits were issued to take deer. Only 55 deer were reported taken under this authority. The number of deer taken under depredation permits, while temporarily reducing deer numbers locally, does not measurably impact deer populations regionally or statewide.

EFFECTS OF CHANGES IN HUNTING REGULATIONS BY ADJOINING STATES

Very few non-residents choose California as a hunting destination. In fact, the five-year average (1998-2002) for out-of-state license sales was merely 2.3% of total sales (Department files). Accordingly, the Department believes that any changes in hunting regulations by adjoining states would need to be drastic (e.g., closure of an entire season for a particular species) in order to produce a potentially significant increase in non-resident license sales and any associated potential increase in harvest. Deer hunting in California is by quota only, which is designed to prevent over harvest of deer. Consequently, the Department concludes the hunting regulations of adjoining states will have no significant impact on California's deer populations.

EFFECTS OF MAJOR DEVELOPMENT PROJECTS (Moved to Cumulative Impacts)

EFFECTS OF PROJECTS ON U.S. FOREST SERVICE LANDS (Moved to Cumulative Impacts)

WELFARE OF THE INDIVIDUAL ANIMAL (Moved to end of Chapter 4)

EFFECTS ON PREDATORS AND SCAVENGERS

The primary predators associated with deer in California are the mountain lion, black bear and coyote. Deer fawns are taken in some cases by bobcats and golden eagles. Few scientific evaluations of the relationship between deer and their predators have been conducted in California. Connolly (1981) reviewed case histories related to predators and deer and concluded that careful local study is necessary to determine whether predation controls deer numbers. Connolly (1981) also concluded most evidence suggested lions relied heavily on deer as their primary food source and coyotes were most effective in taking young fawns. The most important conclusion from Connolly's review was that deer numbers in California are ultimately limited by the quality and quantity of habitat, which in turn limit predator populations.

Despite the fact that predators, especially lions, rely on deer as a primary food source, there is no indication that historic levels of regulated deer hunting have affected their populations (Bertram 1984). The influence of hunting of forked horn or better male deer only would not be expected to affect any deer predator, because only a small segment of the deer population is affected by hunting. The duration and intensity of more liberal deer hunting proposals would determine their potential influence on local predator populations.

Hunting of deer as proposed will not have a significant adverse effect on scavengers. Based on its analysis of the proposed project, the Department has estimated that approximately 34,000 deer will be taken by hunters during the 2004 season (approximately one deer per three square miles). While these carcasses will be removed from the field by hunters and not left for scavengers, this level of removal should not have any significant negative effect.

The Department's assessment is based on the magnitude of the hunter take compared to the number of available carcasses to scavengers as a result of natural deer mortality. For example, the Department estimates that the doe population in 1999 was about 289,000. Thus, nearly 554,000 fawns were born in California. By the end of winter, nearly 75 percent (approximately 415,500) will have died from natural causes. This, together with the additional natural mortality of the adult segment of the herd, contributes greatly to the forage base of scavengers.

EFFECTS ON LISTED SPECIES

The Commission has listed a number of plant species as endangered, threatened or rare and a number of animal species as endangered or threatened which occur in the project areas. These are contained in sections 670.2 and 670.5, Title 14, CCR.

Historically, no conflicts have been identified between deer hunting and listed species (e.g., habitat destruction or take). Therefore, it is reasonable to expect that this situation will not change because of the proposed project. However, lead poisoning has been a chronic and significant cause of migratory bird (primarily waterfowl) mortality associated with hunting in some areas of North America. Birds ingest spent lead shotgun pellets and scavengers may ingest fragments of lead bullets in carcasses or gut piles (Fry 2003). The ingested lead is converted to soluble form, and absorbed into tissues, which can have lethal effects. Secondary poisoning of predatory birds can also occur when they feed on birds carrying lead pellets embedded in body tissues (Fry 2003). The USFWS has mandated the use of nontoxic shot for waterfowl hunting. The use of nontoxic bullets is not required for the hunting of deer, although hunters in the condor range are urged to use nontoxic bullets

The dispersed hunting effort and resulting scattered bullet deposition over vast acreage make it unlikely that lead bullets would ever become concentrated enough to present any significant hazard to wildlife. Therefore, the Department does not believe that the use of lead bullets for hunting deer will result in any significant adverse environmental impacts.

EFFECTS ON OTHER RECREATIONAL OPPORTUNITIES

Hunting affects public recreational opportunities in a variety of ways. Many hunters plan their annual vacation times to correspond with the deer hunting season, while others plan their vacations to avoid being in the "woods" during the hunting season. Deer hunting provided recreational opportunity to 147,578 individuals in 2002. Approximately 1.3 million hunter-days of recreation were expended on deer in 2002 (California Department of Fish and Game 2002).

In cases where non-hunters feel threatened or unsafe as the result of deer hunting, there are potentials for conflict with non-hunting activities in hunt areas. This effect is considered at a minimum, because most of the hunting seasons occur after the peak summer months, when most of non-hunting activities occur on public land.

EFFECTS ON ECONOMICS

A recent study estimated the relative value of hunting and viewing deer in California (Loomis *et al.* 1989). Deer hunters and the general public derive substantial benefits from the presence of deer in California. The study indicated that the deer hunting season is valued at $230 million per year by the hunters themselves (using 1987 dollars). The business activity generated by hunter and viewer expenditures generates $184 million (1987 dollars) in personal and business income in California each year (Loomis *et al.* 1989). Approached from the employment side, hunter expenditures support 7,700 jobs in California.

EFFECTS ON PUBLIC SAFETY

Since 1975, the number of people killed while deer hunting each year in California has ranged from zero to six, and the number of people wounded has ranged from two to 13. The highest number of accidents occurred in 1975, when six people were killed and 13 people were wounded. In 2001, there were 2 fatalities and 2 non-fatal accidents while deer hunting.

Not to diminish the fact that people have died or been wounded while deer hunting, these figures indicate that, based on the total number of deer hunters in California and the annual number of accidents, there is roughly a 0.0015-0.00425 percent chance of being killed or wounded while deer hunting.

Additionally, Department records show that no nonhunter injuries or deaths have occurred as a result of deer hunting. As with any outdoor activity, there is always a risk of injury or death. However, the probability of being injured while deer hunting is extremely low. This good safety record is due, in part, to the requirement that all hunters must successfully pass a hunter safety education course prior to receiving a hunting license.

CUMULATIVE IMPACTS

This section will analyze the cumulative effects of the proposed project, together with other projects, human-caused non-hunting mortality and varying environmental conditions. An analysis of the cumulative effects of human induced changes to the habitat and human-caused non-hunting mortality (illegal take, depredation, road kills, etc.), together with all other factors (e.g., natural processes, such as vegetative growth over time (succession), drought, wildfire, disease and parasites), is critical to the development of proposed hunting regulations throughout the State that will ensure the maintenance of viable, healthy deer populations.

Major long-term fluctuations in deer populations are controlled primarily by the quantity and quality of their habitats. A factor which affects the amount and relative quality of deer habitats is human intervention. This intervention takes many forms. The various resource management activities (e.g., urban development, timber harvesting and grazing) that convert

habitat (change from one habitat type to another or to non-wildland) and/or modify its structure dictate the long-term status of deer populations.

EFFECTS OF LAND MANAGEMENT ACTIVITIES (2003 document page 178)

Timber Management - Biomass Thinning

Since the mid 1980s, biomass thinning of conifer stands has increased in northeastern California. Biomass thinning is a term used to describe a forest management practice that removes most trees and shrubs from conifer stands using rubber-tired shearing equipment known as "feller bunchers". This equipment can shear trees up to 18 inches in diameter. The harvested material is processed using a "chipper" on site and transported to cogeneration plants and burned to produce energy. Foresters promote the process because it provides a method of thinning timber stands resulting in increased growth and health of trees retained. A completed biomass project usually leaves a relatively open stand of young trees, approximately 20 feet apart with little vegetation retained on the ground. This work is being done on tens of thousands of acres of forest in northeastern California. It is being conducted on both U.S. Forest Service (USFS) lands and property owned by private timber companies.

This kind of forest management can have profound impacts on wildlife (including deer) habitat. Impacts can occur from the loss of cover, loss of forage, and potential for loss of nutrient recycling. In addition, the process is thought to significantly reduce the chance of wildfire, thus reducing the potential for regeneration of fire maintained shrubs that are critical for deer forage.

Positive impacts on deer and other wildlife could result if steps are taken to modify the typically used prescriptions. For example, strategically located cover patches could be retained while selected areas are heavily harvested to open the forest canopy and stimulate the growth of shrubs. These practices would increase available forage and provide habitat diversity by providing mosaics of shrubs and trees. Recently, these practices are being incorporated in some thinning projects in an effort to provide for wildlife needs.

Based on its analysis, the Department has determined recent biomass thinning of timber stands in some areas of northeastern California has resulted in reduced habitat quality for deer. Populations have declined as the carrying capacity of the habitat has been reduced. However, total acreage treated by this method is small. Habitat conditions and the deer populations in those areas impacted by biomass thinning are being closely monitored.

Livestock Grazing

Grazing of livestock on wildlands in California has occurred for over 100 years. Research has shown livestock can have significant impacts on deer and deer habitat (e.g., Loft 1988). The potential for competition increases during drought conditions, and most affected are key habitats such as mountain meadows, riparian, aspen, and antelope bitter brush. Decreased

range productivity on rangelands caused by below-normal precipitation, and continued heavy grazing has likely reduced carrying capacity for deer and other wildlife. The Department has formally appealed two BLM grazing decisions in eastern Lassen County because of grazing problems related specifically to deer. The problems of overgrazing are being addressed at both the local and State level and increased monitoring of conditions on the range, as well as for the deer, are ongoing to resolve the problems.

The Department has determined livestock grazing results in decreased carrying capacity for deer in many areas of the State. This impact affects the entire deer population and translates into reduced harvest proposals for bucks in many zones. The proposed level of harvest, primarily bucks-only, will not significantly affect the overall condition of the populations.

Hardwood Range Management Activities

Deer use California's hardwood habitats throughout all seasons of the year. However, greatest use occurs during the fall and winter when migratory deer move into hardwood habitats from the higher elevation conifer-dominated habitats. California's hardwood habitats are dominated by several species of oaks, including blue, canyon live, coast live, interior live, valley, Oregon white, and California black oak. Other important hardwood species include Pacific madrone, California buckeye, tanoak, and California laurel. In California, Bolsinger (1988) estimated that hardwood-dominated woodland and forest habitats occur on 9.6 million acres, while hardwoods are an important component of other habitats on another 11.7 million acres. Therefore, hardwoods occur on over 20 percent of the total land area in California.

Despite their widespread occurrence and relative abundance, hardwood habitats are under ever-increasing pressure from a variety of land uses that have adverse effects to deer populations. In woodlands and rangelands, these land uses have been and continue to be fuelwood cutting, rangeland clearing, residential and commercial development, and reservoir development. In forestlands, timber management, biomass harvesting, and residential and commercial development are adverse land uses.

From 1945 to 1985, Bolsinger (1988) estimated a net decline of 425,000 acres of hardwood-dominated habitats from 10.0 million acres in 1945 to 9.6 million acres in 1985. However, the net decline resulted from a decline of 1.2 million acres on woodlands and an increase of 760,000 acres on forestlands where hardwoods increased as conifers were harvested. Between 1989 and 1992, the California Department of Forestry and Fire Protection (CDF) estimated that 5,000-8,000 acres/year were cut for fuelwood. These cuts ranged from clearcuts, where all trees were removed, to light cuts where canopy cover declines were sometimes no more than 10 percent. Before the early 1970s, rangeland clearing was the major cause of the decline. CDF reported 1.9 million acres were cleared for rangeland conversion between 1945 and 1973, of which 890,000 acres or 32,000 acres/year were thought to be hardwood woodlands and rangelands (Bolsinger 1988). However, residential and commercial development has recently become the leading cause of hardwood habitat conversion, averaging 7,400 acres/year between 1966 and 1984 (Bolsinger 1988).

CDF Fire and Resource Assessment Program (FRAP) has projected impacts to hardwood habitats by development through the year 2040. "FRAP estimates that seven out of nine Hardwood habitat types will have at least 10 percent of their 2000 base area impacted by development at a density of at least one housing unit per 20 acres by 2040. Certain hardwood habitats are more susceptible than others to development. Valley Oak Woodland and Valley Foothill Riparian are particularly vulnerable because of their low abundance, limited reserve status, and adjacency to intensively developed land uses. Blue Oak Woodland, Blue Oak-Foothill Pine, and Coastal Oak Woodland also face development pressures, but have far larger distributions (FRAP 2003)."

Deer populations can be adversely affected by these land uses through removal of mature trees that provide mast, browse, and cover. Additionally, the habitat is often converted to grassland, agricultural lands, or residential areas. The Department has been and continues to be concerned about adverse land uses in California's hardwood habitats. Most of the Department's concern centers around the northern Sacramento Valley, Central Sierra Nevada foothills, southern California, and Central Coast where residential and commercial development, fuelwood cutting, and agricultural conversion are occurring. As a member of the Integrated Hardwood Range Management Program, the Department is working closely with CDF and the University of California in researching and monitoring California's hardwood resources, as well as educating the general public about the values of hardwoods. In addition, the Department is cooperating with the USFS and private timber companies in developing mitigation strategies that avoid, minimize, or offset adverse impacts to hardwood resources from timber harvesting. The Department has a Hardwoods Policy and Interim Wildlife/Hardwood Management Guidelines that addresses the importance of hardwoods to wildlife and directs the Department to work to protect and conserve California's hardwood resources. Despite these efforts, the rapid growth of California's human population and the incessant need for open land for housing will put substantial pressure on hardwood habitats.

While these changes in the hardwood lands of California are having a negative effect on deer and other wildlife, the Department has determined the proposed project will not have a significant adverse cumulative effect on the deer population. In fact, where habitat quality is diminished by hardwood harvesting and conversion, deer harvest resulting from the proposed project will have a beneficial effect on the deer population.

Summary of the Impacts of Land Management Activities

The Department annually modifies, and will continue to modify, hunting proposals as necessitated by localized declining deer populations. As the total population of deer declines because of the various land management activities that affect any given herd, this will ultimately be reflected in declining numbers of bucks proposed for hunting. Most of California's deer herds are at or near the carrying capacity of their ranges because of land management factors which are exacerbated in some areas by drought conditions. History has shown that under such circumstances, range condition will continue to decline because the deer population is too high to be supported by the available forage. Given that deer populations typically remain at or near carrying capacity provides further evidence that

regulated harvest of bucks has little if any impact on deer populations. In areas where environmental conditions become most extreme, reduction of the entire population through hunting may be warranted to reduce the negative impacts that overpopulations of deer may have on their habitat.

Overall, land management activities have significant impacts on California's deer populations. The Department estimates that if all land management activities were refocused to specifically benefit deer, the State's deer population could increase over time to one million or more animals as it was in the past. However, deer are just one species among hundreds to be considered and managed for, and wildlife overall are just one use among many potential uses of wildlands. The impacts of a program that is nearly exclusively bucks-only hunting will not significantly affect deer populations alone or in combination with land management activities.

EFFECTS OF MAJOR DEVELOPMENT PROJECTS

Significant effects of emerging projects on each deer herd are addressed when appropriate by the Department in the annual updates of each deer herd management plan. Major projects planned for the near future are not expected to significantly affect deer populations in California.

In ongoing efforts to address the individual and cumulative effects of specific projects on deer and other wildlife, the Department provides input on wildlife habitat protection measures in County General Plans and planning documents of the USFS, BLM and other land management agencies. The Department provides information on deer habitat, including locations of critical seasonal ranges and migration routes for migratory deer herds. Information is also provided on how best to manage timber and rangelands to benefit deer. The Department has significantly influenced county land use planning throughout the State. Counties such as Sierra, Plumas and Shasta have modified development plans to benefit deer.

EFFECTS OF PROJECTS ON U.S. FOREST SERVICE LANDS

The USFS manages approximately 20 percent of the State's wildland. As such, management activities of the USFS affect deer populations through the direct manipulation of their habitats. Because of the potential cumulative effects of these management activities on deer and other wildlife, the Department plays an active coordination role with the USFS in long-range planning and on-the-ground forest management activities. More specifically, in most areas the USFS is a signatory to the individual deer herd management plans. Thus, by policy, the USFS assists the Department to achieve the objectives of the approved plans.

To guide Federal agencies in resource management activities, the Environmental Quality Improvement Act was passed in 1970. From this, the National Environmental Policy Act (NEPA) was established as the basic national charter for protection of the environment. It establishes policy, sets goals and provides means for carrying out the policy. Specifically, NEPA contains "action-forcing" provisions to make sure Federal agencies, such as the

USFS, act according to the letter and spirit of the Act. Furthermore, regulations are established which tell Federal agencies what they must do to comply with the procedures and achieve the goals of the Act. It is through the implementation of this mandate the Department provides input into land management planning and on-the-ground habitat manipulation activities (e.g., timber harvesting, hardwood removal, burning, etc.). Through the national forest planning process, fish and wildlife habitat programs are developed. The primary goal of these programs is to provide healthy populations of all native species (including deer) and desired non-native species. Because the USFS is responsible for managing habitats, they focus on providing and maintaining critical habitat elements (food, cover and water) for all localized species. The forests also coordinate habitat management with the Department and the U.S. Fish and Wildlife Service (USFWS), who are responsible for managing animal populations.

The forests, Department and USFWS cooperatively develop management program priorities for individual species, such as: (1) Federally threatened and endangered species; (2) USFS sensitive species; (3) State threatened and endangered species; (4) important harvest species (e.g., deer and bear); (5) State species of special concern; and (6) other species of special interest. Management plans for deer are guided by the approved deer herd management plans.

Through this joint cooperative effort, desired population levels are often established for these species. This is accomplished by: (1) preparing forest-wide maps of suitable habitat; (2) mapping all sighting record data; (3) estimating current and potential populations; and (4) coordinating with the Department and other responsible agencies to determine desired animal numbers. The implementation of this plan is accomplished through peer-reviewed habitat management prescriptions coordinated with the Department.

To ensure the cumulative effects of projects on deer habitat and populations are considered in forest planning and management activities, the Department participates in a three-phase planning/project analysis process. This quite lengthy and comprehensive process has been established to provide broad-based management direction to maintain and protect wildlife (including deer). This management direction helps ensure activities that may be detrimental to deer populations are mitigated. More importantly, long-range planning by the USFS includes the Department's wildlife goals and recommendations. Hence, stability is provided to much of the State's deer population through this ongoing cooperative effort. This process is in place in each of the 21 national forests in California.

During the environmental review process, the Department provides comments on the adequacy and accuracy of documents prepared prior to initiation of various types of projects, as required by CEQA and NEPA. These comments are directed at making certain these documents adequately describe the effects of a proposed project on wildlife (including deer), and that alternatives to mitigate these effects are presented. The results of these comments have helped to ensure that deer populations, through habitat management, are sustained through time.

The Department's efforts to protect deer habitat through the environmental review process have met with mixed results. In some cases, Department input into the county planning process has resulted in zoning that can be expected to adequately protect critical deer areas; in other cases this has not occurred.

The Department has played an active role in the USFS planning process by providing wildlife input (e.g., deer herd plans and hardwood retention standards) on each land management plan. In addition, when the Department has identified situations where management objectives have not been implemented as agreed to by the approved plan, the Department has filed official appeals. The first appeal of this kind occurred in 1988, concerning the Sequoia National Forest. This process has led to modifications to the plans and land management activities to the benefit of deer.

EFFECTS OF HABITAT CONVERSION (2003 document page167)

Urban Development

An analysis of California's deer habitat was conducted to determine the impact of future development on the quantity of available deer habitat. The Fire and Resource Assessment Program (FRAP) of the California Department of Forestry and Fire Protection has developed a method for mapping the historical, and a scenario for the future, progression of development. The Progression of Development (POD) model provides a historical overview of urbanization and habitat loss for California from 1940 to 1990. In addition, based on development trends and projected population growth, POD estimates how much additional habitat will be lost in subsequent decades. Hence, POD can be used to produce estimates of future habitat loss due to urbanization.

The POD simulation model generates 5km x 5km (9.65 sq. miles) grid cells of land expected to convert from vegetation dominated land type to "urban" land type at 10-year intervals. Development exerts pressure on surrounding lands. Therefore, FRAP defined a lower bound of "developed" at a somewhat low urban density of one unit (human-made structure, such as a house) per 20 acres, or 32+ structures per square mile (Spero, 2001). This definition of "developed" represents an appropriate density level at which habitat becomes unsuitable to deer. While this threshold is somewhat arbitrary, based upon our biological knowledge we believe it represents a suitable level for deer.

Based upon the set criteria of one unit per 20 acres, the POD model was used to generate grid cells of land expected to convert to urban during the decade 2000 to 2010 and 2010 to 2020. These block acreage projections were then overlaid onto the FRAP-VEG 2002, ver. 2 (California Department of Forestry and Fire Protection 2002) multi-source land cover data layer, and calculations of underlying "WHR10" habitat types were made using ArcGis software from ESRI. The WHR10 classification is a grouping of all CWHR (California Wildlife Habitat Relationships System) types into 10 categories. The CWHR wildlife habitat classification system defines 59 wildlife habitats. Considering that the spatial resolution (smallest mapped unit) of the FRAP-VEG layer is 100m, and the POD model utilizes 5km resolution, comparing these two data sets and extracting WHR habitat loss information

would be unrealistic. To alleviate this problem, the WHR10 classification system was chosen as the basis for determining which habitat types would most likely be lost. By grouping the original 59 individual WHR types into 10 categories, the effective spatial resolution was reduced and subsequently allowed a more realistic comparison of the two data sets.

The comparative analysis of habitat loss for deer is displayed in tables 4-2 and 4-3. This information provides an analysis of the expected availability of habitats that will support deer in the future. The comparison of habitat in the year 2000 to habitat in the year 2010 indicates a small overall change (¾ of 1%, or approximately 445,888 acres) in total habitat available to deer. The top five most impacted counties are predicted to be:

- Madera (53,678 acres converted)
- Riverside (47,374 acres converted)
- El Dorado (41,570 acres converted)
- Sonoma (32,721 acres converted)
- Mariposa (27,290 acres converted)

The 2010 to 2020 comparison yields approximately 1% (606,648 acres), of deer habitat lost. The most highly impacted counties expected for this decade are:

- San Diego (80,903 acres converted)
- Riverside (68,091 acres converted)
- El Dorado (48,308 acres converted)
- Kern (37,991 acres converted)
- San Luis Obispo (34,060 acres converted)

The analysis for both decades evaluated shows that hardwood will be the most converted habitat type, followed by shrub, herbaceous, conifer, desert and wetland habitats.

Habitat quantity is continually declining because of urbanization and development. Permanent loss of habitat directly reduces carrying capacity by reducing the acreage of habitat available, and at least in the short-term, by increasing deer pressure on remaining habitats. The location where such habitat losses occur can be of greater consequence than how much habitat is lost. The loss of habitat in areas where deer concentrate for migrations, fawning, or other activities will have a greater impact than in areas with low deer densities and a less critical function. Where changes do occur, wildlife numbers will fluctuate locally but will not significantly affect the stability of the statewide populations.

In areas where habitat conversion is high and hunting is able to continue (often these are incompatible occurrences), localized deer populations could be affected. However, as stated in Chapter 2, deer hunting in the State is predominantly a buck-only harvest. Because bucks comprise only 10-15 percent of the statewide population and an average of 30-80 percent of the buck population is harvested in any given year, annual recruitment replaces those animals lost through hunting. This is true even in a declining herd situation, where forage availability is the limiting factor on the herd.

Analysis of Results

Table 4-4 displays the results (effects) of this analysis. The cumulative effects are expressed as a percent change in habitat value (habitat units). This change was established by determining the initial inventory of deer habitat units (habitat value), beginning in 1980. The difference between the initial decade habitat units and a future decade's habitat units is expressed as a percentage change. It is important to note that the percentage change is unique to the decade and not additive over the two decades (ratings are unique to the decades), as the model inherently addresses cumulative change over the 20-year period.

The result of this cumulative effects assessment shows that the statewide value (habitat quality and quantity) of deer habitat will not change significantly between the years 1990 and 2000. It is projected that conifer, montane chaparral, mixed chaparral and sagebrush habitats will decline in value for deer from one to three percent by the year 2000. In addition, valley foothill hardwood habitats are expected to decline in value statewide by approximately six percent, while the montane hardwood habitat is predicted to increase in value statewide by about eight percent.

Minor negative effects are occurring in each of the major deer habitats, except montane hardwood, with the most significant change occurring in the valley foothill hardwood habitats, where more than a 10 percent decline in deer habitat value is expected in 15 of 58 counties. However, about half of these counties have few acres of the cover type (see Chapter 3 and Appendix 1). Hence, a small loss of habitat units (less than 1,000 acres) can be reflected as a large percent change, when compared with the initial inventory. Considering this fact, most significant change is expected to occur in Placer (-37 percent), Nevada (-18 percent), Sonoma (-14 percent), Yuba (-12 percent), El Dorado (-11 percent) and Lake (-10 percent) counties in valley foothill hardwood habitats.

Most of the significant impacts are occurring, and are expected to occur, in urbanized counties. Because deer populations are already limited in those areas by urbanization, the overall effect is expected to be minor. Exceptions are in counties such as El Dorado, Lake, Nevada, Placer and Yuba, where deer populations exist and predicted effects are expected to be the greatest.

The analysis predicts a significant improvement in the value of montane hardwood habitats for deer. Approximately 21 counties are expected to experience improvements in the value of deer habitat of greater than 10 percent, due to past and current forest harvest practice.

The cumulative impact trends, as provided by this analysis, have been used as part of the analysis of alternatives in Chapter 5. The most biologically conservative (negative) projected trend for 1994, considering available habitat, was used to limit carrying capacity for deer population modeling for project areas. This procedure ensures that the cumulative effects are included in the development of hunting strategies for deer populations.

Table 4-4. Cumulative Effects Assessment of the Proposed Projects Expressed as Percent Change from 1980-1989 in Deer Habitat Value (Habitat Units) by Decade for Major Deer Habitats[a]

	Conifer		Valley Foothill Hardwood		Montane Hardwood		Montane Chaparral		Mixed Chaparral		Sagebrush	
County	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Alameda	-	-	-3	-5	-	-	-	-	<1	-<1	-	-
Alpine	-<1	<1	0	0	-	-	<1	<1	-	-	-4	-7
Amador	<1	<1	-3	-6	40	49	-	-	-3	-2	-	-
Butte	-1	-4	1	2	9	12	-<1	<1	-1	-2	-	-
Calaveras	<1	-1	-5	-7	67	85	<1	1	1	-2	1	1
Colusa	-<1	-<1	-11	-14	<1	<1	-3	11	-1	<1	-	-
Contra Costa	-	-	-3	-6	-	-	-	-	-2	5	-	-
Del Norte	-<1	-2	-8	-16	13	56	0	0	-	-	-	-
El Dorado	-<1	<1	-5	-11	4	5	-1	-1	-2	-4	-	-
Fresno	<1	-2	-1	-2	23	31	<1	<1	-1	4	-7	-14
Glenn	-3	-2	-4	-7	9	10	-1	14	-1	1	-	-
Humboldt	-1	-5	-5	-11	11	25	1	-7	-8	-12	-	-
Imperial	-2	<1	-	-	-	-	-	-	1	6	-	-
Inyo	-<1	-<1	-	-	-	-	0	0	-	-	<1	<1
Kern	-<1	-<1	-2	-3	<1	<1	<1	2	-<1	-1	-3	-7
Kings	2	4	-3	-5	0	0	-	-	-1	9	-9	-15
Lake	-2	0	-6	-10	-3	-4	-3	-4	-4	-2	-	-
Lassen	-2	-4	6	13	27	52	-3	-4	-<1	-3	-1	-1
Los Angeles	-<1	-1	-2	-5	0	0	0	0	-2	-2	-	-
Madera	-<1	-2	-2	-4	-	-	-<1	-<1	-2	-<1	-6	-13
Marin	3	-<1	-3	-7	43	43	-	-	-1	-1	-	-
Mariposa	<1	-1	-4	-7	4	2	-<1	1	-1	-3	-2	-5
Mendocino	1	-<1	-3	-5	-3	-2	-4	-3	-2	-1	-	-
Merced	0	0	-2	-5	-	-	-	-	-1	2	-	-
Modoc	-2	-1	-2	-4	-	-	-2	-2	-<1	-1	-2	-4
Mono	0	0	0	0	-	-	<1	-<1	-	-	-<1	-1

[a] *To fully evaluate the effect of these changes, please refer to the major cover type area estimates, by county, in Appendix 1 (e.g., large percent changes may result from few initial cover type areas).*

- Habitat units do not exist in the county.

0 *No change.*

Table 4-4. Cumulative Effects Assessment of the Proposed Projects Expressed as Percent Change from 1980-1989 in Deer Habitat Value (Habitat Units) by Decade for Major Deer Habitats[a]

	Conifer		Valley Foothill Hardwood		Montane Hardwood		Montane Chaparral		Mixed Chaparral		Sagebrush	
County	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Monterey	0	-2	-3	-5	-<1	-2	0	<1	-1	-3	-2	-5
Napa	3	5	-2	-4	-2	-2	-	-	-1	-<1	-	-
Nevada	-3	-1	-10	-18	<1	-1	-3	-7	-3	-9	-1	-1
Orange	0	0	2	2	0	0	-	-	-7	-12	-	0
Placer	-1	1	-20	-37	-6	-9	<1	2	-<1	-3	0	0
Plumas	-1	1	0	0	12	17	<1	2	<1	-8	<1	<1
Riverside	-1	-<1	0	0	5	0	-	-	-2	-4	-	-
Sacramento	0	0	-32	-34	-	-	-	-	<1	-8	-	-
San Benito	-	-	-4	-7	0	0	-	-	-1	4	-	-
San Bernardino	-1	-3	0	0	<1	0	-	-	-3	-7	-1	-2
San Diego	0	0	-6	-11	-	-	-	-	-3	-5	-	-
San Joaquin	-	-	-1	-3	-	-	-	-	-1	7	-	-
San Luis Obispo	0	0	-3	-7	-1	-3	-	-	-<1	-1	-	-
San Mateo	<1	-7	-2	-5	103	106	-	-	-3	-6	-	-
Santa Barbara	0	0	<1	1	0	0	-2	-7	-1	-1	-	-
Santa Clara	12	8	-3	7	-<1	-1	-	-	-14	-20	-	-
Santa Cruz	-16	23	-1	-2	127	134	-	-	-1	-6	-	-
Shasta	-1	-1	-2	-3	12	18	-2	-1	-1	-2	-1	-2
Sierra	1	2	-	-	-4	-6	-1	-2	0	-2	<1	<1
Siskiyou	5	5	-<1	-1	21	34	-1	-2	-<1	-4	-<1	-<1
Solano	-	-	-22	-24	0	0	-	-	-<1	-5	-	-
Sonoma	-2	-9	-7	-14	5	11	-	-	-1	-2	-	-
Stanislaus	-	-	-<1	<1	-	-	-	-	-<1	-1	-	-
Sutter	-	-	-2	-5	-	-	-	-	<1	-9	-	-
Tehama	-1	<1	-3	-5	13	24	<1	2	-1	1	-	-
Trinity	-<1	<1	-2	-5	3	3	-1	-1	-<1	-1	-2	-3

[a] *To fully evaluate the effect of these changes, please refer to the major cover type area estimates, by county, in Appendix 1 (e.g., large percent changes may result from few initial cover type areas).*

\- *Habitat units do not exist in the county.*

0 *No change.*

Table 4-4. Cumulative Effects Assessment of the Proposed Projects Expressed as Percent Change from 1980-1989 in Deer Habitat Value (Habitat Units) by Decade for Major Deer Habitats[a]

	Conifer		Valley Foothill Hardwood		Montane Hardwood		Montane Chaparral		Mixed Chaparral		Sagebrush	
County	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Tulare	-<1	-<1	-2	-3	24	2	1	-2	<1	-1	<1	1
Tuolumne	<1	-1	-4	-7	57	97	<1	<1	-1	-3	-3	-7
Ventura	-<1	-<1	-11	-20	0	0	0	<1	-2	-5	-	-
Yolo	<1	<1	-2	-4	-	-	-	-	-1	-1	-	-
Yuba	1	5	-5	-12	8	12	-2	-1	-<1	-6	-	-
Statewide	-<1	-<1	-3	-6	5	8	-1	-1	-2	-3	-1	-1

[a] *To fully evaluate the effect of these changes, please refer to the major cover type area estimates, by county, in Appendix 1 (e.g., large percent changes may result from few initial cover type areas).*

- *Habitat units do not exist in the county.*

0 *No change.*

EFFECTS OF WILDFIRE (2003 Document page 167)

Fire is beneficial to deer in most habitat types in California (Leopold 1950, Nichols and Menke 1984). Although there are exceptions, most research has shown burning, especially prescribed burning, to be favorable for deer. Large mammals, such as deer, are able to escape during wildfires, as most areas burn in a patchy fashion, even when large areas are burned (Stoddard 1963, Phillips 1965 and Vogl 1967).

Response of Vegetation to Fire

Although fires in deer habitat may cause short-term losses of food and cover, the new growth that follows is more available and nutritious. Herbaceous forage as a result of fire is important to deer, because it is a good source of protein for pregnant does in the winter and early spring, when protein levels in shrub browse are lowest. Herbaceous plants are highest in protein (15-25 percent) during this period (Nichols and Menke 1984).

In addition to improving herbaceous forage quality, fire improves woody plant quality (browse) for deer. Seedling and resprouting browse species are an important food source in late spring, through the summer, and into the early winter in most parts of California. Fire improves browse conditions, because the resulting new growth is much higher in nutrient content. For several years following a burn, the new shoots produced are available to deer. In addition, fire alters species composition of chaparral stands, often establishing more favorable browse species. For example, Taber and Dasmann (1958) found old stands of chaparral in Lake County were dominated by chamise and interior live oak. In burned areas however, *Ceanothus* species, which are preferred by deer, were more common.

The current fire suppression regime in California was initiated by Euroamerican settlement in the 19th century (Gruell, 2001). This reduction in both wildfire and prescribed burning has resulted in gradual, but significant long-term changes in plant succession with a shift to mature, dense brush stands and increases in young, second growth conifer stands. These changes have resulted in a decline in habitat conditions for deer and are thought to be a major factor contributing to a decline in deer numbers in many parts of the State. Annual changes in deer habitat due to reduced natural fire frequency are expected to be minor. However, without a significant increase in early seral stage habitats, deer habitat quality and quantity are expected to continue to decline.

Based on its analysis, the Department has determined that habitat carrying capacity and thus deer populations will fluctuate over time based on the frequency and distribution of fire. Without changes in current fire management policies that focus on near total suppression, improvements in habitat conditions are expected to be minor. Deer populations will continue to be determined by habitat quality and quantity and will not be affected by the proposed project.

Response of Deer Populations to Fire

Researchers have been able to demonstrate increases in deer use of specific areas within habitats following fire (Klinger *et al.* 1989). In 1956, Dasmann found that deer numbers increased following a wildfire in Lake County from about 31 deer per 100 hectares before burning to about 54 deer per 100 hectares after burning. Research in Lake County indicated that, not only were deer populations higher in areas of chaparral that had been recently burned, but fawn production increased as well (Taber and Dasmann 1957).

Most published information indicates fire improves deer habitat in most areas of California. This includes habitats in hunt zones A, B, C, and D. However, there are situations in these zones where fire is not beneficial and may even be detrimental. This occurs when fire kills substantial numbers of oak trees, thus reducing the availability of acorns (Nichols and Menke 1984). The overall effect is often ameliorated by the rejuvenation of shrub and herbaceous species growing in association with the oaks.

Within the Great Basin habitat type (primarily X zones), which occurs in the northeastern portion of the State, fire is generally thought to be detrimental to deer, because it often kills bitterbrush and sagebrush. These species provide a large portion of deer diets where they occur.

An additional concern is that wildfires are sometimes so large that thermal cover and hiding cover are eliminated, thus restricting deer use to the edges of the burned area (Ashcraft 1979). This effect is temporary and thus is significantly reduced through time by succession (vegetation growing from one stage to another). In spite of these exceptions, wildfire produces long-term benefits to deer in most situations in California (Ashcraft 1979).

The effects of wildfire on deer in the short-term will be minor. In the long-term, both wildfire and prescribed burns will be beneficial by improving habitat conditions in most areas of the State, especially in zones A, B, C, and D. A continuation of the intensive suppression policies of fire protection agencies will result in a continuing decline of habitat conditions in zones A, B, C, and D. Fire in most areas of the X zones, (eastern desert habitats) is considered detrimental and suppression efforts will benefit deer habitat in these areas.

The Department has concluded deer populations in California will continue to be regulated by the quality and quantity of their habitats. Fire, either wild or prescribed, will be beneficial in most areas. These habitat regulated fluctuations will occur independent from hunting and deer populations will not be significantly affected by the proposed project.

EFFECTS OF ADVERSE CLIMATIC CONDITIONS (2003 Document page 169)

Effects of Drought

California has a "Mediterranean climate," meaning that over the long-term the State receives the bulk of its precipitation during the cool fall and winter months, while warm spring and

summer months are generally dry. In other words, California undergoes a "summer drought" each year. However, extreme variation in precipitation occurs in the State on an annual basis. For example, the northwest coast receives a great deal of precipitation, while southern deserts receive very little precipitation. Additionally, topographic features, such as the Sierra Nevada, influence climate by creating a rain shadow whereby most of the precipitation falls on the west side of the range, extracting most of the moisture from clouds by the time they reach the east side of the range. The amount of precipitation falling on California is extremely variable on a geographic basis within a year, and extremely variable in any one area among years (Department of Water Resources, County Precipitation Records).

Drought Effects on Deer Habitats

Droughts are cyclic over the long-term, and all wildlife species and their habitats in California have evolved under conditions of periodic drought (Oruduff 1974, Munz and Keck 1973, Barbour and Majors 1977, Bakker 1972 and Burcham 1975). Since the 1800s, California has been in several drought cycles lasting two to five years (Department of Water Resources data). Because of this natural variation in available water, vegetation communities have evolved and adapted to deal with the associated changes in soil moisture (Barbour and Majors 1977). Many of California's plant communities (e.g., desert, chaparral, grassland, valley foothill hardwood, etc.) are drought tolerant. However, this is not to say that prolonged drought will not affect plant species. Growth and vigor of forage species may be severely reduced during drought, because the seeds of annual plants may not germinate without adequate moisture and shrubs and trees may have reduced growth as a water conserving strategy. Consequently, the quantity and quality of forage for herbivores could be reduced in a drought.

Prolonged drought can affect wildlife habitat by significantly increasing the probability of wildfire. Large acreages that have burned during drought are expected to have major impacts on deer populations in those areas. For example, approximately 200,000 acres burned in 1987 in Zone B-6. The size and intensity of the fire was largely due to extremely dry weather and fuel conditions produced by six years of drought. The deer population in this zone has increased significantly since the fire, due to greatly improved forage conditions as a result of new sprouting brush and herbaceous plants over tens of thousands of acres.

Drought may also weaken resistance of plants to disease, fungus, and insect damage. This would be considered part of the drought cycle in terms of impact on vegetation.

Few specific studies of drought effects on vegetation communities have been conducted, largely because drought is unpredictable, making the gathering of baseline information prior to a drought occurring difficult. A study which measured acorn production (a primary food of many wildlife species) in five oak species occurring at a site in Monterey County encompassed 1980-1989 (Koenig *et al.* 1990). The study determined acorn production was highly variable among oak species from year-to-year and that climatic variables generally did not correlate with annual variation in acorn production. In other words, drought cycles had

little, if any, effect on mast crop failure. The study also indicated that, while on a local geographic scale, acorn crop failures may have detrimental effects on local populations, total crop failures on a community-wide basis among all species are rare, even during drought years. Similarly, acorn production data from Tehama County (Barrett, unpublished data; Fish and Game files, Wildlife Management Division, Sacramento) indicate that from 1987-1990 (drought years), production was approximately 60 percent, 20 percent, five percent and 180 percent, respectively, of the mean annual crop. Hence, during the fourth year of the drought, mast production was exceptional.

Alternately, in annual vegetation communities, lack of fall germinating rains, or minimal spring rains, can preclude germination of annual seeds of forbs (nongrass herbs) and grasses which are important sources of forage, primarily during the fall, winter and spring. The seeds of these species would continue to lie dormant in the soil until germinating conditions were suitable (Barbour and Majors 1977). In the spring of 1991, while experiencing lower than average precipitation statewide, many areas received rainfall at the appropriate time to facilitate spring germination. Events such as this ameliorate the short-term negative effects of drought by providing quality herbaceous forage.

Therefore, during drought conditions, some plant species respond in a way that would benefit wildlife (e.g., increased acorn production), while others respond in a way that would be detrimental to wildlife (e.g., lack of grass and forb growth). These negative effects are minor during the short-term.

Based on its analysis, the Department has determined drought can reduce the habitat carrying capacity of deer in some areas of the State. Deer populations will continue to fluctuate with the carrying capacity of the habitat. A return to normal weather conditions will result in improved habitat carrying capacity and increasing deer populations. The proposed project, primarily bucks-only hunting, will not have adverse impacts on deer.

Drought Effects on Deer Populations

Deer in California and the western United States have evolved to withstand both drought and flood extremes within their natural habitats. The Arizona Game and Fish Department has conducted research that provides information on the effects of drought on deer populations in some habitat types in Arizona. An eight-year study on the Three Bar Wildlife Area found a strong association between rainfall, forage yield and fawn survival (Smith and Lecount 1979). This study also found that, during the same time period, fawns survived much better in a predator-proof experimental enclosure, despite years of very low rainfall. The researchers felt, while predation may be the most important proximal cause of fawn mortality, the condition of the habitat (as affected by rainfall) may greatly alter predation on fawns.

In another Arizona study, Haywood *et al.* (1987) investigated the effects of hunt design and moisture conditions on productivity of white-tailed and mule deer. They found moisture and related forage conditions affect mule deer fawn survival in Arizona much more than hunt

design. It should be noted research results from other locations should be applied to California with some caution, since climatic conditions and other factors may be substantially different.

Significant effects on fawn survival due to drought could occur in some areas of the State. However, fawn survival data do not indicate deer populations are being negatively affected except in a few areas of the State. Periodic drought conditions produce short-term effects, but have little, if any, long-term effects on the abundance of deer.

Summer die-offs of numerous deer are also possible and have been reported in northern California. If deer herds decline in number to a size at which proposed levels of hunting could have an effect, the Department would initiate management/regulatory action to avoid significant detrimental effects. In some areas, mild winter conditions and the timing of precipitation actually increased fawn survival.

Finally, the cumulative effect of drought on the population is measured annually by the Department through population surveys (herd performance). Increases and decreases in deer populations as a result of drought are reflected in the ratios of bucks and fawns per 100 does observed by the Department. Based on these observed conditions, the Department adjusts its recommended harvest quotas to maintain the herd ratio objectives provided in Table 1-1.

Effects of Winter

Deep snow cover can prevent deer access to forage resulting in poor body condition, malnutrition and starvation. Snow depth may govern the distribution of deer on winter ranges (Connolly 1981). Winter starvation in mule deer can limit deer density and is affected by population (ecological) density, winter severity (Connolly 1981 and Hobbs 1989) and body mass (age, genotype and condition) when entering the winter (Saltz and White 1991).

Prolonged winters and high population density increases stress levels in deer whereas having a larger body mass lowers stress levels in individual deer (Saltz and White 1991). Yearlings and fawns are particularly vulnerable to the effects of severe winters. Fawn survival has been directly related to winter conditions as cold weather increases their energetic needs (de Calesta *et al.* 1975, Bartmann *et al.* 1992). Survival of mule deer in California "is a matter of adapting to prolonged periods of nutritional stress" which is "the situation in which they evolved in North America" (Wallmo 1978).

In 1993, the State received 141 percent of normal precipitation. While this benefited deer (forage growth and vigor) in many areas of the State, above normal overwinter adult mortality occurred in the northwest portion of the coast range (e.g., Mendocino County) and the eastside of the Sierra Nevada (X-zones). As a result, tag quotas in the X zones were greatly reduced to allow these affected deer populations to recover. Since that time, some deer populations have increased significantly, and tag quotas in these areas have been increased to reflect the population changes.

Emergency Feeding

The issue of large-scale emergency feeding programs to sustain deer populations through severe winters has been controversial since the early 1930s (Lenarz 1991). Emergency feeding can benefit deer by reducing winter mortality and increasing the fawn survival rates following spring (Lenarz 1991). However, research into the effectiveness of winter feeding programs has been contradictory.

Some researchers have demonstrated it is possible to maintain deer on nutritionally balanced food programs (Ullrey *et al.* 1971, Baker and Hobbs 1985, Ozoga and Verme 1982). Others found as more deer became dependent on supplemental feeding and less on natural forage, the greater the winter loss of deer (Doman and Rasmussen 1944). Supplemental feeding, even for short periods, results in deer congregating and overbrowsing what forage is available; promotes the spread of disease; and increases vulnerability to predation (Leopold 1933). While there are methods that could reduce these risks, such as rotational feeding and placing feed near ample cover, these feeding programs are often infeasible and are not cost-effective (Leopold 1933, Lenarz 1991).

Emergency feeding can fail as a result of feeding deer too late, as deer will continue to die even after days or weeks of feeding them (de Calesta *et al.* 1975). Thus, winter losses of starving deer are not preventable (Carhart 1943, Doman and Rasmussen 1944). Some species of microorganisms in the rumen die during starvation rendering deer unable to digest the supplemental feed (Giles and McKinney 1966, Pearson 1969). Thus, toxic fermentation and metabolic products resulting from emergency feeding can cause mortality in starving deer. However, deer can starve for up to 64 days and be fed successfully depending upon the physiological condition of the deer (de Calesta *et al.* 1975).

A more permanent solution to reducing mortality of deer due to the effects of severe winters is to work towards ensuring an array of diverse habitats that include thermal cover. Deer typically use evergreen trees and shrubs for thermal cover on winter range (Leckenby *et al.* 1982). Old growth and multi-storied forests with canopy closures of greater than 50 percent can provide deer with adequate thermal cover and forage species to sustain them through harsh winters (Connolly 1981, Leckenby *et al.* 1982).

Deer expend considerable energy to seek food during conditions of deep snow. It is not likely deer will leave thermal cover to seek forage given these energy costs. Therefore, more prudent measures to reduce winter stress on deer herds is for management plans on public lands to include adequate habitat for thermal cover (Parker and Gillingham 1990).

The cumulative effect of severe winter weather on the population is measured annually by the Department through population surveys (herd performance). Increases and decreases in deer populations as a result of severe winter weather are reflected in the ratios of bucks and fawns per 100 does observed by the Department. Based on these actions, the Department adjusts its recommended harvest quotas to maintain the herd ratio objectives provided in

Table 1-1. Based on its analysis, the Department has determined that severe winter weather, together with the proposed project, will not have an adverse cumulative effect on deer populations.

EFFECTS OF NONHUNTING MORTALITY (2003 Document page 174)

There are numerous hazards and threats to life that deer must contend with in their life history. In their yearly travels, they encounter highways, canals, reservoirs, streams and residential developments. Substantial deer losses can result in areas where migration corridors pass through these obstacles (Bertram 1984). In high runoff years, drowning losses may be severe as deer attempt to cross waterways.

Predation, diseases/parasites, harassment from dogs, collisions with vehicles and illegal take (poaching) losses are regarded as potential problems to deer herd productivity in localized areas, especially residential or developed areas that have encroached on deer ranges or are near migration corridors.

These mortality factors are automatically taken into consideration in the development of hunt proposals because the data, upon which proposals are based, are directly influenced by the mortality factors. These mortality factors contribute to the final tally for fawn and buck ratios estimated each year.

Illegal Take

Only estimates are available regarding the number of deer taken by poaching (illegal take) in California. During the winter of 1975-76, the Department attempted to estimate the number of deer poached. As a test, four Department employees poached deer, or simulated poaching, in a total of 134 incidents. Over the 102-day duration of the test, three (2.2 percent) of the incidents were detected and reported.

From this example, poaching was reported about two percent of the time (Department unpubl. memorandum on file in Wildlife Management Division, 1416 Ninth Street, Sacramento, California 95814). However, in order to apply this finding statewide, it requires speculation on: (1) the actual number of deer killed illegally; (2) the number of illegal kills detected; and (3) the number of violations that go undetected. Thus, based on this test, it is unreasonable to conclude, "out-of-season kills occur at a rate nearly twice that of legal in-season take". There is no statistical basis for such a conclusion. The Department maintains records of actual cases related to illegal activity, which includes other types of violations in addition to illegal killing of deer, but does not summarize actual records of illegal take reported by the public and Department. It has been estimated individuals involved in illegal take have a 99.5 percent chance of eluding detection and arrest (Connolly 1981), but there is no evidence to suggest similar levels of detection and arrest are valid in California at this time.

The nature of illegal take as a secretive activity precludes developing any irrefutable estimates of actual losses of deer. This is partly because great assumptions need to be made about the behavior of individuals involved in such activities, i.e., how secretive they are, how well they hide evidence, and so on.

Other poaching simulation tests have been conducted in Idaho where poaching was estimated to be about 12 percent (or 8,000 animals) of the legal harvest, and in New Mexico where poaching was estimated to result in the loss of about 34,000 deer per year (these are very imprecise estimates) (Connolly 1981).

Given current and predicted levels of game wardens, the Department concludes illegal take of deer will continue to occur and it is not possible to state (regardless of the size of the game warden force) with any certainty how many deer are illegally taken in California. However, if it were significant, it would be reflected in localized deer populations as an excessive mortality factor. Currently, no California deer herds exhibit any evidence that they are significantly affected by illegal take.

The cumulative effects of illegal take are automatically incorporated in the annual estimates of surviving fawn, doe and buck numbers (ratios). Therefore, the cumulative effects of illegal take, legal harvest and other factors causing deer mortality are considered minor and ultimately dictate the proposed harvest quota.

Effects of Diseases and Parasites

Infectious (bacterial, viral) and parasitic diseases can act alone or in combination with other factors to negatively affect a deer population (Hibler, 1981). In other words, an infectious or parasitic disease can be a primary mortality factor or more often is the consequence of the interaction of one or more environmental factors (predisposing factors), such as poor range condition, drought, heavy precipitation, or high population density; the presence of the disease agent; and a susceptible host. Because of this interaction between disease, host and environment, the presence of disease can be used as an indicator of predisposing factors, such as habitat quality. Hibler (1981) noted that there were some exceptions to the "predisposing factors." For example, some viral diseases (bluetongue and adenovirus hemorrhagic disease) can kill healthy deer in areas of high quality habitat. Sporadic disease die-offs most likely occur each year. Large-scale die-offs are rare, but have occurred in the past (Leopold *et al.*, 1951). In 1986 the Department did observe significant mortality due to hemorrhagic disease in black-tailed deer in Trinity, Tehama, Mendocino, Humboldt, Siskiyou and Modoc counties. Bluetongue virus was isolated from one deer (Siskiyou County), and adenovirus (AHD) was diagnosed in two deer (Siskiyou and Sonoma counties). In 1987, mortality due to hemorrhagic disease was limited to Lake County. The actual cause of the mortality during 1986-87 epizootic has not yet been determined. Evaluating the impact of disease on free-ranging deer is difficult as fresh, diagnostic carcasses are often unavailable. Mortality estimates are crude assessments as many carcasses remain undiscovered or are quickly removed by scavengers. The deer losses during the 1986-87 epizootic were not reflected in buck kill or fawn-to-doe ratios (Work and Jessup, 1990).

In 1993, a deer die-off was reported in more than 10 counties (in the coast range and west slope of the Sierra Nevada). The newly recognized adenovirus hemorrhagic disease was eventually diagnosed as the cause of this epizootic. Most of the die-off sites or "hot spots" were associated with urban-residential areas where local over-populations of deer existed.

The long-term effect of disease or parasitism is reflected in the status of the deer herd, which is monitored annually by the Department. The cumulative effect of disease-related mortality is accounted for in the proposed harvest quota.

Effects of Vehicle-Caused Mortality

Few studies have attempted to estimate the total number of deer killed by motor vehicles annually in California. Accurate estimates of the number of deer killed by vehicles are difficult to obtain for several reasons: (1) incidents are not always reported; (2) carcasses may be removed by the public; (3) scavengers may consume or move carcasses from the roadway; and (4) deer that are not immediately killed may move from the roadway prior to death and are not easily detected.

The Department, assisted by the Division of Highways and county road departments, conducted an extensive study to estimate the number of deer killed by vehicles (California Department of Transportation 1967). This study estimated that over 8,500 deer were killed on highways in the State in 1967. Mansfield and Miller (1974) reported that the deer kill in the California Department of Transportation's District 02 was 7,275 during the period 1971 through 1973. The area encompassed by District 02 included north central and northeastern counties in California.

Because of the difficulties and cost of collecting these data, the Department has not implemented a statewide data collection program. However, in an effort to address this source of mortality, the Department has investigated recommending the use of animal "warning systems," such as whistles and reflectors. The California Highway Patrol and Utah Division of Wildlife Resources (UDWR) have experimented with "Sav-A-Life" and "Game Saver" warning whistles mounted on their State vehicles. The UDWR concluded that the whistles do not work (UDWR pers. comm.). CalTrans conducted a three-year study (1990 to 1992) regarding the use of "Swareflex" reflectors, which are mounted alongside roads to reflect headlights at right angles to the road into the deer's eyes. CalTrans concluded that those reflectors had no significant influence on the number of deer killed (Ford and Villa, 1993). No further studies regarding these reflectors are planned, and those reflectors placed for the purposes of this study were removed.

Additionally, the Department assists CalTrans in identifying areas where the construction of deer-proof fencing and highway underpasses would substantially reduce the number of deer/vehicle incidents. These structures are particularly useful along deer migration routes, reducing the loss of deer along these highways to virtually zero.

As with other factors discussed in this section, the ultimate effect of vehicle-caused mortality is reflected in the status of the deer herd, which is monitored annually by the Department. Therefore, the cumulative effect of this source of deer mortality is accounted for in the proposed harvest quota.

Effects of Predation on Deer Populations (2003 Document page 165)

In California, mountain lions are the primary predator of mule deer. In eastern California, mountain lions were the primary cause of death among migratory mule deer in an intensively studied population (Clark 1996), consistent with findings from other parts of western North America (Hornocker 1970, Nicholson et al. 1997, Bleich and Taylor 1998). Both male and female deer are killed by these large felids, but some selection according to age of individual deer has been demonstrated. Recent research (Pierce et al. *in review*) has shown that female lions with kittens select young deer, which are relatively small in body size, when compared with deer killed by male lions and females without offspring at heel. This difference in prey selection may be related to the nutritional requirements of the female, degree of difficulty of capture of larger prey, or minimizing risk associated with the capture of larger prey because of the presence of dependent offspring and the residual effects on parental investment by the female (Pierce et al. *in review*). Additionally, most studies of mountain lions have demonstrated that, in general, male deer were more vulnerable to predation by lions. However, in at least some situations female deer appear to be more vulnerable than are males (Bleich and Taylor 1998). A recent investigation (Bleich and Taylor 1998) reported that deer in poor physical condition did not seem predisposed to predation by mountain lions.

Because mule deer form the bulk of the diet of mountain lions, investigators have attempted to determine the rate at which deer are killed by these large felids. In general, the consensus among most investigators is that a mountain lion will kill mule deer at a rate of approximately one per week. Empirical data from southern California substantiate this estimate (Beier et al. 1995), although mountain lions in eastern California are known not to have killed deer for intervals of as long as three weeks (B. M. Pierce and V. C. Bleich, unpublished data).

Coyotes also prey on mule deer, particularly young-of-the year (Knowlton 1976, Bowyer 1987). Coyote predation, in fact, can be intense with respect to neonatal deer, and the presence of the remains of these small individuals has been used as an indicator of the timing of birth in mule deer (Salwasser 1974). In eastern California, coyotes were responsible for 22 percent of the deaths of deer due to all forms of mortality combined (Clark 1996). Thus, the significance of coyote predation as a factor potentially important in the dynamics of populations of mule deer cannot be dismissed.

Bobcats are capable of killing mule deer and are known to do so (Garner et al. 1976, Epstein et al. 1983). Nevertheless, predation by bobcats probably occurs infrequently when compared to predation by mountain lions and, even, coyotes. In all probability, bobcats prey

primarily on the young mule deer, as is the case with white-tailed deer (Boulay 1992, Labisky and Boulay 1998), but they are known to kill adults (Labisky and Boulay 1998).

While mule deer are the primary prey of mountain lion and are also killed by coyote and, to a lesser degree, by bobcat, the effects of predation on the dynamics of deer populations are poorly understood and may warrant greater consideration than has been afforded in the past. For example, in the same geographic area, the effects of predation by mountain lions has been described as unimportant by one investigator (Janz and Hatter 1986) and as having strong local effects by another (McNay and Voller 1995). Moreover, Lindzey et al. (1994) reported no changes in density of a population of mountain lions in Utah despite an increase in a population of mule deer, consistent with the notion that factors other than prey abundance were responsible for limiting numbers of mountain lions. Further, these data suggest that the lion population was not capable of preventing an increase in the deer population at the density at which lions occurred, and that predation by these felids was not an important factor in the dynamics of that deer population.

In Colorado, Anderson et al. (1992) estimated that 35 mountain lions were responsible for the deaths of 8 to 9 percent of a deer population, estimated at 24,000 deer on their study area, during a single year. In Arizona, Shaw (1980) calculated that 40 adult mountain lions removed 15 to 20 percent of the wintering North Kaibab mule deer herd (estimated at 6,500 individuals) during 1977-78, and that 15 mountain lions removed less than 10 percent of a somewhat lower population in 1980. In eastern California, a dense population of mountain lions (approximately 6 lions located/telemetry day) on a migratory deer winter range failed to preclude the growth of a deer population estimated at 1,050 animals. In January 1999, the same deer population numbered approximately 2,300 individuals, while the density of mountain lions declined to an average of less than one individual lion located/telemetry day (V. C. Bleich, California Department of Fish and Game, unpublished data). In essence, the deer population more than doubled during 1992-1999, while the density of mountain lions on the winter range declined to less than 20 percent of its former value during the same period.

The published and unpublished observations referenced above suggest that mountain lion predation did not regulate these deer populations during the periods under study, given the low percentage of animals removed from the populations and the high reproductive potential of mule deer. Nevertheless, when combined with other sources of mortality that may be additive, predation could become more important as a factor influencing the dynamics of deer populations. Indeed, mountain lions are important predators of mule deer, and the effect of lion predation on the population dynamics of these ungulates warrants further attention, particularly among deer populations inhabiting arid, unpredictable environments (Bleich and Taylor 1998). It is clear that additional detailed and specific investigations are necessary to evaluate factors that may regulate populations of mule deer, including the role of predation (Hornocker 1976, Knowlton 1976, Connolly 1981).

SYNTHESIS OF CUMULATIVE EFFECTS ANALYSIS (2003 document page 203)

After a thorough evaluation of the proposed project over time, in conjunction with other related past, present and reasonably foreseeable or probable future projects and changing environmental conditions (wildfire, illegal take, drought, etc.), the Department has concluded there will be no significant adverse cumulative impacts on deer populations in the State. This conclusion was based upon a careful analysis of the environmental impacts of the project, together with other projects and environmental conditions.

This finding was made based primarily on the following:

1. The proposed project calls for hunting bucks and limited numbers of antlerless and either-sex deer. Hunting under these regulated conditions, together with other projects and changing environments, is not expected to have a significant negative cumulative effect on deer populations, as the proposed hunting mortality is largely compensatory. The hunting strategy and resulting cumulative effects are consistent with the deer management policy and conservation goals of the Department for maintaining and enhancing wild deer populations statewide.

2. Over a period of more than 100 years of hunting of deer in California, no significant negative cumulative impacts on deer have occurred. Therefore, it is reasonable to expect the proposed project will continue to have no significant impacts.

3. The Department's deer management program is, in part, based on achieving herd ratio objectives. These herd goals are stated in each deer herd management plan. Since, at the current harvest levels hunting is largely compensatory relative to its effect on the population as a whole, the herd objective influenced most by hunting regulations is the buck-to-doe ratio in each hunt zone. Maintaining these buck-to-doe ratio objectives is taken into account in all hunt proposals.

4. The Department's recommendations and the Commission's regulation-setting process involve an annual review of the status of each deer herd and hunt zone. This review assesses the annual effects of hunting mortality and nonhunting mortality, such as predation and illegal take, on deer populations. Considering these effects, appropriate adjustments in season and quotas are made on an annual basis to achieve herd goals.

5. Threats to the deer resource are associated with habitat loss or degradation. Hunting is independent of this threat and, in fact, may be used as a management tool to help ensure deer are maintained within the capability of their habitat.

6. After careful modeling of changes in deer habitats, the Department has concluded that these changes, together with the proposed project, do not constitute a significant adverse environmental impact.

GROWTH INDUCING IMPACTS OF PROPOSED ACTION

The proposed project is not expected to foster any economic or human population growth in the State because of the short duration, transient nature of the proposed action and wide distribution. As previously discussed in "Effects on Economics", the project is expected to provide a limited amount of economic benefit to local economics. The proposed project would thus maintain the level of impact as experienced in previous years.

Based on its analysis, the Department has determined the proposed project will not have a significant adverse effect on growth.

SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Limited sport hunting of deer does not have a long-term negative effect on deer populations. Under controlled/regulated conditions as contained in the proposed project, hunting mortality in the short-term will result in a slight reduction of the population. However, due to fawns being born in the late spring/early summer (after the fall hunting season), the population will exceed the pre-hunt population size. Thus, hunting does not have a negative effect on the population over the annual cycle. Rather, in many circumstances, hunting mortalities can be considered beneficial to the population as a whole by providing an opportunity for increased survival of young animals.

The cumulative effects (see "Cumulative Impacts") of the proposed project over time, in conjunction with other related past, present and reasonably foreseeable or probable future projects and changing environmental conditions (e.g., drought, wildfire, illegal take, etc.) are analyzed. The Department has concluded from this analysis that the proposed project will not have any significant adverse cumulative effects on deer populations in the State.

State law requires that the Commission annually review the mammal hunting regulations and that the Department present its recommendations (proposed project) for changes to the mammal regulations to the Commission at a public hearing in February. These proposals are designed to avoid any significant adverse effects on the hunted species. Moreover, sport hunting, as proposed, can have a beneficial effect on the health and condition of the population (see Chapter 1).

SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

No significant irreversible environmental changes are expected to occur as a result of the proposed project. The proposed harvest levels were selected to not adversely impact hunted populations, but rather to improve deer population status by attempting to achieve herd management objectives. The proposed project is designed to avoid significant adverse impacts on other wildlife species, their habitat and to listed or locally unique species, as discussed previously. Moreover, adverse impacts to economic, public uses (including safety) are not expected.

WELFARE OF THE INDIVIDUAL ANIMAL (2003 Document page 183)

Section 203.1, Fish and Game Code, provides as follows: "When adopting regulations pursuant to Section 203, the Commission shall consider populations, habitat, food supplies, the welfare of individual animals, and other pertinent facts and testimony."

Consideration of deer population, habitat, food supply and other facts pertinent to the anticipated effects of the project on deer are contained in the environmental document that the Department has prepared to satisfy its obligation to comply with CEQA. This section deals only with considerations of individual animal welfare. This subject is discrete and distinct from those included in the CEQA-mandated environmental analysis. It is an additional obligation imposed on the Department by the Fish and Game Code. This section is included in this document for convenience and to permit the public and interested persons to consult a single document in order to read and evaluate the Department's analysis.

The project-related effects on individual animal welfare include:

1. The animal may be chased and suffer anxiety, fear and stress;
2. The animal may experience pain and suffering;
   a. Effects of being shot with a bullet,
   b. Effects of being shot with archery equipment,
   c. Effects of being killed by dogs.
3. The animal may die; and
4. The animal may be wounded but not die.

Each of these effects are discussed in greater detail as follows:

CHASE-RELATED EFFECTS

The project may result in individual animals being chased. During the majority of the deer season, individual hunters may be accompanied by a dog. During the portion of deer season that overlaps the black bear season, hunters may be accompanied by many dogs.

It is possible that an individual animal will be chased by dogs. Such a chase may cause the animal to suffer anxiety, fear and stress. Anxiety is generally defined as an unfocused response to the unknown (Journal of the American Veterinary Medical Association (JAVMA 1987). Fear is a focused response to a known object or previous experience (JAVMA 1987, p. 1,187). Stress is commonly defined as the effect of physical, physiologic or emotional factors that induce an alteration in an animal's homeostasis or adaptive state.

Stress and its subsequent responses may be categorized in three ways. These are: (1) neutral stress - this form of stress is not intrinsically harmful and evokes responses that neither improve nor threaten the animal's well being; (2) eustress - stress that involves environmental alternations that in themselves are not harmful to the animal but which initiate responses that may in turn have potentially beneficial effects; and (3) distress - stress that

creates a state in which the animal is unable to adapt to an altered environment or to altered internal stimuli (JAVMA 1987, pp. 1,187-1,188).

Animals experience anxiety and fear in response to naturally occurring stimuli. For example, deer are naturally chased by predators. Hunt-related chasing by dogs may subject the individual deer to anxieties or fears that are qualitatively different from naturally occurring anxieties and fears, because only coyotes are known to pursue deer the way a pack of dogs does (Cahalane 1947). However, there is no published scientific information on this potential effect.

It is assumed that deer, if given a choice, would choose not to be pursued. In this sense, chasing may be viewed as having an adverse effect on individual animal welfare.

The three recognized forms of stress (JAVMA 1987, pp. 1,186-1,187) have different manifestations. Eustress is not applicable. The project will not alter the individual deer's environment. Deer have evolved an exceptional physical ability to flee from pursuers. Consequently, a chase by hunt dogs does not represent a change to the deer's natural environment sufficient to prompt further evolutionary responses.

Neutral stress and distress are both potentially relevant and adverse. Neutral stress would be exhibited by an animal fleeing from pursuing dogs and would probably continue up to the point at which the chase ended. Presumably, the chase would end when the animal evaded its pursuers or was shot by the hunter.

A pursued animal may also suffer some degree of distress. The distress would become more acute if the animal were cornered or otherwise became unable to successfully flee. If the stress-inducing stimuli are short-term, the animal's responses do not generally result in long-term harmful effects. Prolonged or excessive stress may result in harmful responses such as abnormal feeding, social and reproductive behavior. Long-term distress in animals can result in pathologic conditions such as gastric and intestinal lesions, hypertension and immunosuppression (JAVMA 1987, p. 1,188).

Both neutral stress and distress may be viewed as adverse effects on the welfare of individual animals. Neutral stress resulting from the project may be different from naturally occurring neutral stress because of the possibility of being chased by multiple dogs. It is not expected to have any long-lasting effects, because each chase presumably terminates with the deer's escape or death. Although distress is capable of producing long-term adverse effects, the project is not expected to have that result, because the hunting season is of limited duration, and any distress-inducing conditions will be temporary.

PAIN AND SUFFERING

Few premises are more obvious than that animals can feel pain (JAVMA 1987 p. 1,186). However, determining whether an animal is experiencing pain or suffering is difficult. Despite this difficulty, many manifestations of pain are shared by many animal species

(JAVMA 1987, p. 1,186). The intensity of pain perceived by animals should be judged by the same criteria that apply to its recognition and to its physiologic and behavioral observations in human beings. If a condition causes pain in a human being, it probably causes pain in other animals (JAVMA 1987, p. 1,188).

Suffering is a much used and abused colloquial term that is not defined in most medical dictionaries. Neither medical nor veterinary curricula explicitly address suffering or its relief. Therefore, there are many problems in attempting a definition. Nevertheless, suffering may be defined as a highly unpleasant emotional response usually associated with pain and distress. Suffering is not a modality, such as pain or temperature. Thus, suffering can occur without pain; and, although it might seem counter-intuitive, pain can occur without suffering (JAVMA 1987, p. 1,188).

Although there are anecdotal accounts of deer being shot and exhibiting no visible signs of pain, the Department assumes that pain results from substantially all incidents of animals being shot, either by arrows or bullets. The degree of pain experienced by individual animals probably ranges from little or no pain to significant pain.

There are accounts of individual deer shot through with an arrow that continue grazing, apparently oblivious to a fatal wound and collapsing some 20 to 30 seconds later from blood loss (International Bowhunter Education Manual 1989, pp. 33-34 and Georen 1990a). There are also instances of individual big game animals shot with arrows or bullets that react instantly to the impact and run a considerable distance before collapsing (Dahlen 1959, Department field observations and Benke 1989). These probably represent the extremes.

Since the concept of suffering carries with it the connotation of time, it would seem there is little or no suffering where death comes immediately. There may be considerable suffering where death is delayed.

The project has been designed to limit pain and suffering by the specification of prescribed methods of take described below. These method restrictions are designed to make the hunting equipment highly lethal to the target animal.

Methods for taking deer are regulated during the general season under the provisions of Section 353, Title 14, CCR. These restrictions are as follows:

> Deer may only be taken by rifles using centerfire cartridges with softnose or expanding bullets; bow and arrow (see Section 354, Title 14, CCR, for archery equipment regulations); or wheellock, matchlock, flintlock or percussion type muzzleloading rifles using black or pyrodex powder with single ball or bullet loaded from the muzzle and at least .40 caliber in designation.
>
> In addition, shotguns capable of holding not more than three shells firing single slugs may be used for the taking of deer. In areas where the discharge of rifles or shotguns with slugs is prohibited by county ordinance, shotguns capable of holding not more than three shells firing size 0 or 00 buckshot may be used for the taking of deer only.

Pistols and revolvers using centerfire cartridges with softnose or expanding bullets may be used to take deer. Crossbows may be used to take deer only during the regular seasons.

Muzzleloading rifle hunters may not possess other firearms or archery equipment authorized for taking big game, pursuant to subsections 353(a) through (d), and shall possess muzzleloading rifles equipped with iron sights only, while hunting under the provisions of a muzzleloading rifle only tag.

Under the provisions of a muzzleloading rifle/archery tag, hunters may possess muzzleloading rifles as described in subsection 353(a) equipped with iron sights only; archery equipment as described in Section 354; or both. For purposes of this subsection, archery equipment does not include crossbows.

Archery equipment during the archery deer season is regulated under Section 354, Title 14, CCR. The archery restrictions are as follows:

A bow, as used in the regulations, means any device consisting of a flexible material having a string connecting its two ends and used to propel an arrow held in a firing position by hand only. Bow includes long bow, recurve or compound bow.

Crossbow, as used in the regulations, means any device consisting of a bow or cured latex band or other flexible material (commonly referred to as a linear bow) affixed to a stock or any bow that utilizes any device attached directly or indirectly to the bow for the purpose of keeping a crossbow bolt, an arrow or the string in a firing position. However, a crossbow is not archery equipment and cannot be used during the archery deer season.

For the taking of deer, hunting arrows and crossbow bolts with a broadhead-type blade which will not pass through a hole seven-eighths of an inch in diameter shall be used.

No arrows or crossbow bolts with an explosive head or with any substance which would tranquilize or poison any animal may be used.

Moreover, no arrow or crossbow bolt may be released from a bow or crossbow upon or across any highway, road or other way open to vehicular traffic.

Bows that will not cast a legal hunting arrow, except flu-flu arrows, a horizontal distance of 130 yards may not be used.

Archers may not possess a firearm while hunting in the field during an archery season or while hunting during a general season under the provisions of an archery-only tag.

No person may nock or fit the notch in the end of an arrow to a bowstring or crossbow string in a ready-to-fire position while in or on any vehicle.

Effects of Being Shot With a Bullet

In the case of bullets, it has been determined center-fire bullets transfer sufficient energy to the animal to cause fatal wounds and traumatic shock adequate to bring about quick death. Despite these performance standards, time to death is affected by shot placement. An animal shot with a gun in the heart-lung area or a critical portion of the central nervous system, such as the brain or spinal cord, will generally die in less than 22.3 seconds, with a range from one to 26.4 seconds (Ludbrook and Tomkinson 1985, p. 13). An animal shot in a less vital area may not die for a considerably longer period of time, ranging from 240 to 360 seconds, depending on the location (Ludbrook and Tomkinson 1985, p. 13). Some shots in nonvital areas wound but do not kill the animal (Benke 1989).

Effects of Being Shot With Archery Equipment

Recently, the efficacy of using archery equipment for the take of big game has been questioned. In particular, concern has been expressed that animals taken with archery equipment experience undue suffering. Section 354, Title 14, CCR, contains provisions for the use of archery equipment for the take of deer. It restricts arrows to those with a broadhead type blade that will not pass through a hole seven-eighths of an inch in diameter. In addition, bows used for deer must be of sufficient strength to cast a legal hunting arrow a horizontal distance of 130 yards. These restrictions are designed to ensure animals are taken with equipment capable of killing efficiently.

In order to fully disclose the various aspects of the controversy about the use of archery equipment to take big game, the Department has conducted a thorough review of the archery literature and salient archery issues (Mayer and Samuel 1992).

ARCHERY WOUNDING ISSUES

The public, as well as wildlife managers and scientists, have raised numerous questions regarding archery wounding. The issue of archery wounding is controversial. These questions have created public concern over the effects of archery wounding on big game populations and the welfare of individual animals. In order to address these concerns, the Department has identified and analyzed the key archery wounding issues. These issues were identified based on the concerns raised in scoping sessions, past testimony at Commission meetings, previous lawsuits and the literature (scientific and popular). The major archery wounding issues are as follows:

1. **Fewer Animals are Taken with Archery Equipment than with Firearms** – In 2003, the estimated California deer harvest was 29,086. Of this, the archery take was estimated at 2,347 while 26,739 were taken with general methods (rifles, pistols, shotguns, etc.). Studies by Downing (1971), Fuller (1990), Stormer *et al.* (1979),

Similar results were reported by Lohfeld (1979) and Burke *et al.* (1976), where less than one percent of the animals taken by hunters showed signs of debilitating hunting wounds.

11. **In Order to Make Arrows More Lethal and Lessen Archery Wounding Losses, It Has Been Proposed That Archery Hunters Be Required to Use SCC as an Alternative or Adjunct to Broadheads** – Benke (1989), Pacelle (1990), Boydston and Gore (1987) and Causey *et al.* (1978) support the use of SCC as an alternative to render arrows more lethal, hence reducing wounding loss. Benke (1989), in *The Bowhunting Alternative*, presents the idea that using the drug SCC on broadheads will reduce wounding losses. The author utilizes personal opinion, personal experiences and selected references from the literature to establish his conclusion.

"To render bowhunting even minimally humane," Benke advocates "the use of the tranquilizer SCC as a means of ensuring that the target animals will die quickly without needless misery." He is contemptuous of "elitists" who, arguing that using such a drug diminishes the primal pleasure and athletic challenge of the sport, are willing to inflict needless suffering on their hopeless prey.

Causey *et al.* (1978), in a study of bowhunting white-tailed deer with SCC-treated arrows, found that the average elapsed time to knock-down time was 13 (ranged from zero to 45) seconds. This result was based on 42 observations of the 88 deer shot with SCC-treated broadheads (16 percent wound rate and three percent known crippling loss with SCC-treated arrows). The authors found that wounded deer traveled an average of 112 (ranged from zero to 376) paces (approximately 100 meters) after being struck by a treated arrow. They conclude that "the addition of SCC to the broadhead hunting arrow in the manner described herein greatly increases the killing efficiency of the bow and arrow. The question is whether the decreased crippling rate and increased recovery rate of deer shot with drug-treated arrows adequately compensates for any undesirable aspects of using these arrows.

There are several aspects of the drug issue, such as legality, humaneness, and public safety and ethics, which need further discussion. There is some question about whether the use of such drugs is legal under Federal law, pending testing of the delivery system (SCC pod) by the Food and Drug Administration. Also, SCC is an extremely dangerous drug. Placing chemical substances on arrows could lead to the accidental death of a person coming into contact with the arrow.

Dr. Edward Otten, a nonhunter and Director of Toxicology in the Department of Emergency Medicine at the University of Cincinnati Medical Center and a member of the Board of Directors of the Wilderness Medical Society, suggests that using SCC would make death less humane, because it kills by suffocation (pers. comm.). Postoperative muscle pain occurred in 60 percent of patients given SCC (Verma *et al.* 1978, Waters and Mapleson 1971).

Research conducted by Dr. E. Murl Bailey, a Professor of Toxicology, Experimental Surgery and Pharmacology at Texas A&M, has found that drugs such as SCC cause a very cruel death (M. R. James, *Bowhunter* April/May 1990). Dr. Bailey's research shows that massive doses of SCC cause very painful death, as consciousness continues long after respiration ceases. He concludes, therefore, that the drug can cause inhumane deaths and is dangerous for use in bow and arrow sport hunting.

Gutierrez *et al.* (1979) discuss the ethics of using SCC in a paper on hunting ethics, self-limitation and the role of SCC in bowhunting. Although they strongly believe that the incidence of wounding deer should be decreased, they do not subscribe to the use of drug-treated arrows to accomplish this goal for the following reasons:

a. "The concept of bowhunting as a primitive sport placed emphasis on hunting skills rather than equipment sophistication. Adding drugs to modern archery tackle eliminates much of the primitive aspect of the sport--the aspect giving bowhunting its greatest appeal to many archers.

b. "The potential danger of increasing the incidence of fatal human accidents from drugged arrows must be considered carefully once the entire animal becomes a vital area, as shot selection and good arrow placement are less important. Under these conditions we feel there will be a tendency for less cautious target identification, thus increasing the potential for human error and accidents.

c. "Crippling rate (more accurately wounding rate) and crippling loss are not equivalent, but with drug-treated arrows more wounded deer would die.

d. "As Leopold (1943) warned and Kozicky (1977) reemphasized, the modern hunter is quickly becoming a gadgeteer. Some sportsmen have refused to become a part of this gadget-oriented hunting trend; they choose to use muzzle-loading firearms and archery equipment (although there certainly are gadgeteer archers). Their attempt at self-limitation is evidence of their efforts to increase the sport in sportsmanship. Wildlife managers should be encouraged by, and should encourage this attitude. The use of drug-treated arrows would likely encourage less competent archers to go afield unless more stringent requirements were set to qualify for an archery license."

EFFECTS OF WOUNDING ON ANIMAL WELFARE

Wounding is a generic term referring to any nonlethal injury (McCaffery 1985). The nature of the specific wounds ranges from superficial to seriously disabling (Nettles *et al.* 1976, Burke *et al.* 1976 and Lohfeld 1979). In many cases, a seriously disabling wound may lead to the animal's death from secondary causes, such as infection or disability preventing the animal from successfully foraging for food, evading natural predators or performing other functions necessary to its survival (Nettles *et al.* 1976).

The wounding of animals is an unavoidable result of hunting. Wounding rates vary considerably, depending on the type of equipment used (guns or archery equipment). Death caused as a result of these wounds (wounding loss) varies as well. Some authors suggest archery wounding rates and loss is as high as 80 to 100 percent of the legal take (Boydston and Gore 1987, Benke 1989 and Pacelle 1990). Others believe, while archery wounding rates can be as high as 50 percent of harvest (Downing 1971 and Herron 1984), wounding loss is less than 15 percent (Lohfeld 1979, Herron 1984, Ludbrook and Tomkinson 1985, and Fuller 1990).

The effects of these wounds on the individual animal are the subject of much debate. Benke (1989) states that broadheads are ineffective in killing deer and thus cause much pain and suffering. The contrary view of this effect is offered by Georen (1990a). They believe lethal wounds result in quick, near painless death due to blood loss. Moreover, Nettles *et al.* (1976) asserts that long-term suffering resulting from traumatic injury probably affects very few deer.

Existing evidence is inconclusive as to the extent to which archery wounds lead to infection. Benke (1989) and Pacelle (1990) state that a common cause of death is septic infection caused by arrow wounds. They contend arrows generally inflict dirty wounds, because numerous hairs are drawn into the wound. Bacteria from the clipped hairs begin multiplying in the wound channel and eventually cause death.

The Department was unable to identify any published studies that measure or evaluate whether these wounds cause septic conditions. It has been suggested (Georen 1990a) that nonlethal wounds cause relatively clean wounds and such wounds bleed profusely. This results in an inner- cleaning effect before bleeding is impeded by thrombosis, arterial spasm or coagulation.

It is clear that wounding causes pain. The extent or level of this pain (considering the type of wounds) felt by the animal is unclear, as the information available is inconclusive. The project has been designed to limit wounding through the specification of minimum performance requirements for archery equipment and firearms. It is expected that some wounding will nevertheless occur. The methods of take are not 100 percent lethal. Lethality is largely a function of hunter skill and accuracy.

CHAPTER 5. ANALYSIS OF ALTERNATIVES

Alternatives are analyzed in this chapter. Five alternatives and the proposed project, which fall into one of two categories, are presented and analyzed. These two categories are Alternatives 1 through 3 that have statewide effects, and the Proposed Project and Alternatives 4 and 5 that have effects specific to a particular hunt area. The alternatives and the proposed project evaluate several strategies listed below:

Alternative 1 - Bucks-Only Harvest
Alternative 2 - No Archery
Alternative 3 - No Use of Dogs
Proposed Project - Desired kill
Alternative 4 - High kill
Alternative 5 - Low kill

The analysis for Alternatives 1 through 3 combine all the hunts for the entire State to evaluate their effects. This includes general season, additional, area-specific archery, fund-raising, and PLM hunts. In other words, the effects of Alternatives 1 through 3 are evaluated considering all the deer in the State as one large group.

The analysis for the Proposed Project and Alternatives 4 and 5 are specific to each of the 44 hunt zones in the State, each of which represents a herd or group of herds. Within each zone, all hunts specific to that zone are combined to evaluate the effects of the alternatives. This includes the general season hunt, additional hunts, area-specific archery, fund-raising, and PLM hunts within the zone. Hence, the effects are evaluated considering all the deer in each zone as one large herd. This is reflected in the list of hunts under the Proposed Project and alternatives for each zone.

The Proposed Project represents management options (elements) within a particular hunt zone that will achieve a desired kill (DK) from the herd(s). DK refers to a harvest strategy that provides for a harvest of animals with a safety margin to protect against over harvesting the herd(s). This safety margin is usually in the form of reduced tag quotas and/or seasons. Alternative 5 represents management options (elements) within a particular hunt zone that will achieve a high kill (HK) from the herd(s). HK refers to a harvest strategy that maximizes the number of animals that can be harvested from a population, commensurate with the goals and objectives stated in the herd plans, for at least the next year. A potential problem with a HK management strategy is the risk of overharvesting. If, under a HK program, an overharvest occurred, more conservative management strategies would have to be implemented the following year to correct the situation.

Alternative 5 represents management options (elements) within a particular hunt zone that will produce a relatively small harvest. This low kill (LK) is a harvest strategy that provides hunting opportunities at reduced levels from those proposed under either HK or DK strategies.

The Commission may select Alternatives 1 through 3 or a combination of elements within the Proposed Project and Alternatives 4 and 5 for any particular zone because the effects of a combined project will fall within the analysis of the Low kill project (Alternative 5) and the High kill project (Alternative 4). The Commission may also select a no-project, reduced (in terms of kill) project, or no-change option for any element within the Proposed Project and Alternatives 4 and 5 because the effects of such an action would fall somewhere within the analysis for Alternative 1 and Alternative 5. In other words, the effects of any combination of the alternatives presented have been analyzed and provided in this chapter.

In the first year of the Commissions three-year environmental document/regulation cycle, the Department receives (Fish and Game Code Section 207) public recommendations for modifying the deer hunting regulations through letters to the Department and Commission, and public testimony at Commission meetings. Where appropriate, public recommendations are used as hunting alternatives for a given zone or additional hunts. In years two and three of the three-year cycle, the Department submits regulation changes to the Commission to address biological emergencies, clarity issues, and changes to take quotas.

The hunting alternatives are presented below by hunting zone. The general zone (including Section 554 areas), additional, area-specific archery, fund-raising, and PLM hunts discussed in the Proposed Project are described in detail in Chapter 1, and sections 360 and 361, Title 14, CCR.

Each alternative and the Proposed Project was analyzed using KILLVARY, a computer simulation model developed to estimate deer population size and analyze the effects of various harvest strategies on deer populations. Thus, each alternative receives an equal level of consideration and analysis. The KILLVARY Model inputs and data used to run the model are described in Chapter 1. The results for Alternatives 1 through 3 are described at a statewide level (because of their statewide effects). The results for the Proposed Project and Alternatives 4 and 5 are described for each hunting zone and are accompanied by a table to aid the reader in understanding the possible effects of the hunting alternatives. Specifically, the effects of the alternative on total kill, the proportion of bucks in the herd (buck ratio) and the population size are presented.

The specific process for developing the elements of the Proposed Project and Alternatives 4 and 5 for each of the zones is depicted in Figures 5-1 and 5-2. The KILLVARY Model, as a result of the process described above and in Chapter 1, produces a number of bucks and does that can be harvested to meet the goal/criteria for each element of the Proposed Project and Alternatives 4 and 5. In addition, a harvest buffer is developed and evaluated for each alternative by hunt zone. The harvest buffer is an additional number of deer (unallocated) that could be harvested within the hunt zone that would not have a significant adverse effect on the deer population. Additionally, the number of bucks and does expected to be killed on PLMs and by archery only hunters are subtracted from the harvest allocation (Figure 5-2). The remaining number of bucks and does are then allocated to the hunts listed under each alternative based on the desired harvest and on past and expected hunter caused mortality rates for each hunt. New hunt tag quotas are based on estimated hunter caused mortality rates of similar existing hunts either in the same or similar zone.

Figure 5-1. Alternative Evaluation Process

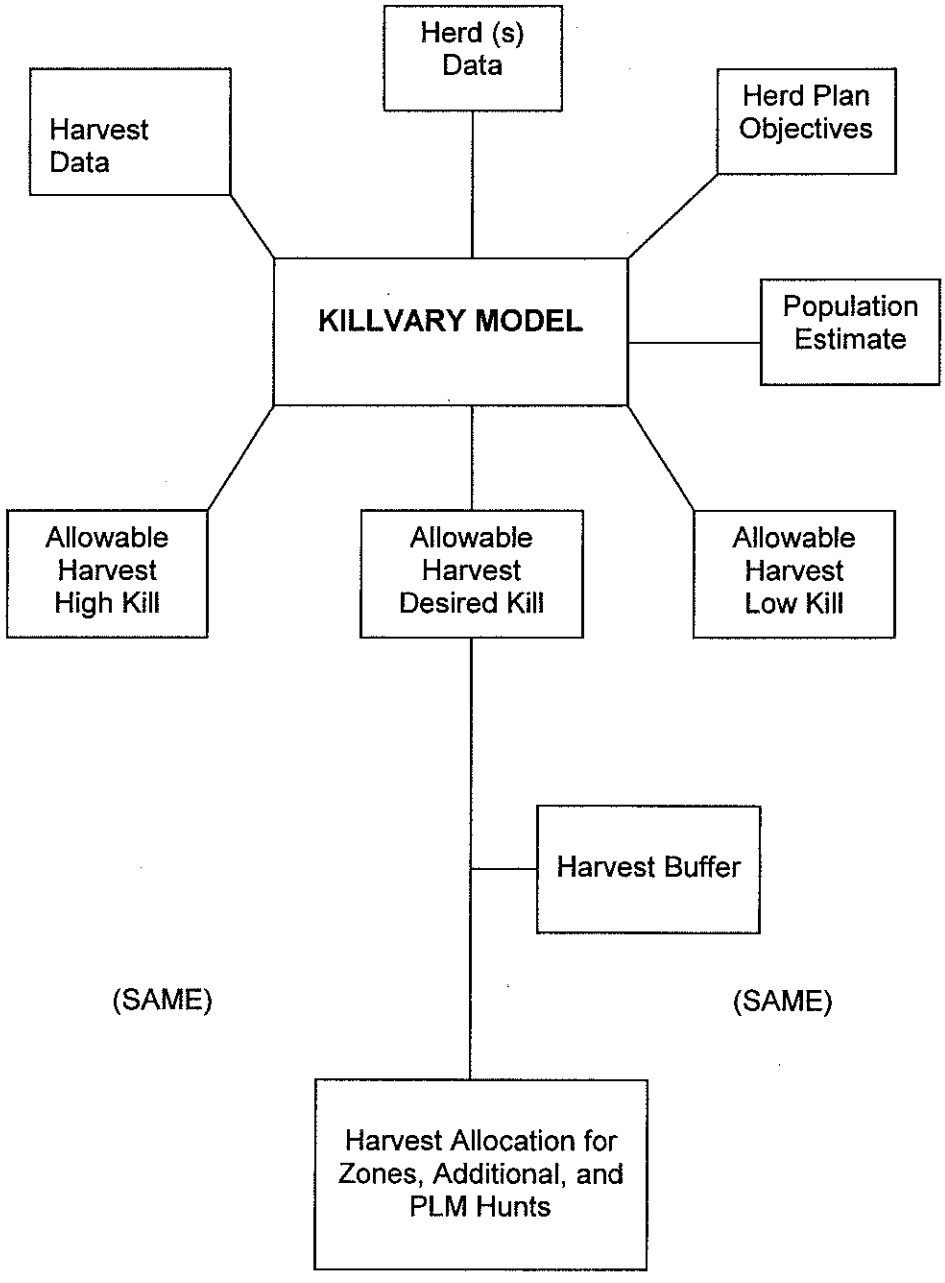
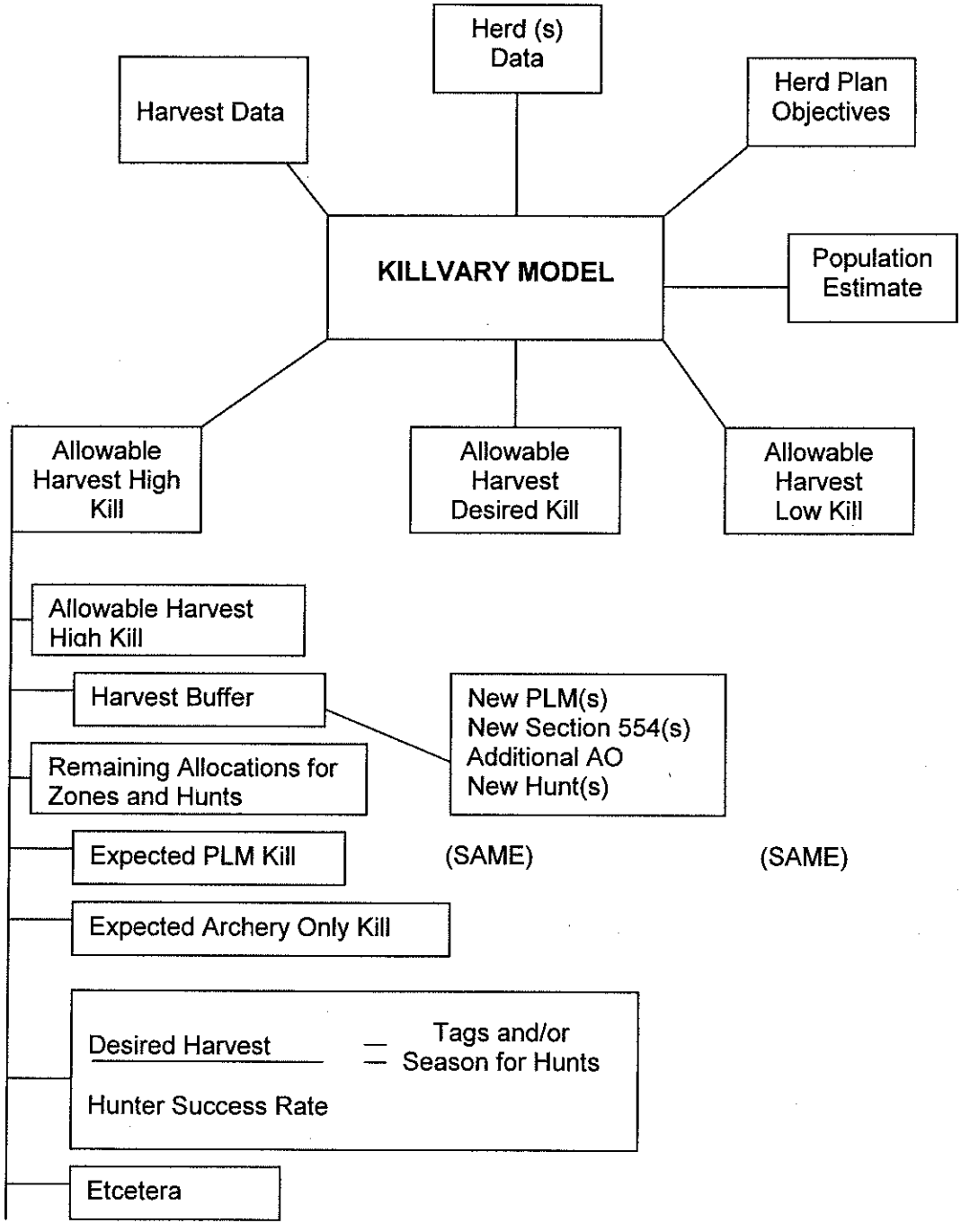


Figure 5-2. Tag and Season Allocation Process



This process results in the tag range and/or hunt season listed for each of the hunts under the Proposed Project and Alternatives 4 and 5.

The harvest buffer allocation is to allow for small adjustments in tag quotas or hunts, new PLMs, new Section 554 areas, and new hunts that might be proposed by the public during the Commission meetings. The buffers have been developed such that whether or not any part of the buffers are eventually allocated, the hunts will have no significant adverse effect on the deer resource or the ability of the project to achieve its goals.

ALTERNATIVE 1 - BUCKS-ONLY HARVEST

Eliminating the harvest of antlerless and either-sex deer would affect localized hunts scattered throughout the State. Therefore, all deer zones were combined in one model run to represent the effects on individual herds. Hence, the trends approximate the effects on a local level (Table 5-1). The results of the KILLVARY modeling show that harvesting only bucks slightly reduces the total harvest, as few antlerless deer are killed each year in California (an estimated 606 considering all hunting mortality). In addition, buck ratios could drop slightly as well, because fewer fawns are recruited into the population, and about half of these fawns are bucks.

Table 5-1. Alternatives 1-3

Alternatives	Buck Ratio	Population Size	Deer Kill
2003	29	525,230	29,084
Alt 1: Bucks-Only Harvest	29	475,580	34,294
Alt 2: No Archery	29	475,580	31,947
Alt 3: No Use of Dogs	29	475,580	34,578

Limited antlerless and either-sex hunts reduce the average age of adult deer in the population, which can result in increased fawn recruitment for herds which have exceeded carrying capacity. Fawn survival can thus increase in response to reductions in the adult population through increased availability of forage to fawns. Under the bucks-only harvest alternative fawn recruitment would decrease slightly, average age of the adult population would increase, and the population would be more prone to periodic fluctuations in size in response to forage availability.

ALTERNATIVE 2 - NO ARCHERY

This alternative would eliminate the use of archery equipment for deer hunting statewide. In 2003, approximately 8.1 percent of the total estimated deer harvested in California were

taken by archers. Under this alternative, which is graphically presented in Table 5-1, buck ratios and deer populations would not be expected to change.

The no-archery alternative may result in a slight increase in buck ratios, but would not significantly affect any deer population (Table 5-1). Recreational opportunities for at least 15,000 archery-only bowhunters would be lost. Additionally, general zone tag holders that hunt with a bow during the archery season would be deprived of this hunting opportunity. Economic impacts would include, but not be limited to, a loss of revenues to the Department from reduced license and tag fees, and lost personal and business income (Loomis *et al.* 1989).

ALTERNATIVE 3 - NO USE OF DOGS

This alternative would prohibit the hunting of deer with the use of dogs in California. Some members of the public feel that using dogs is unsporting and are concerned with the health of deer populations as the result of their use. Hunters, which generally support the use of hunting dogs, feel their use is a traditional method of hunting which provides a better opportunity to kill a deer. It is expected that this alternative would result in a loss of hunter opportunity, increase the number of unrecovered dead or wounded deer, and reduce the stress of deer that might have otherwise been chased by a dog(s).

Hunter opportunity would be reduced because some hunters would no longer be able to use a dog to find and recover deer, and may choose not to hunt. Using dogs to hunt deer is a technique that allows hunters to more efficiently locate deer. Studies indicate that hunters that use dogs have a higher success rate than hunters without dogs (Spencer 1986). In some areas, this lower success rate may result in higher buck ratios. However, because the number of hunters using dogs to hunt deer in California is believed to be small, it is doubtful such an effect would be realized.

The effects of this alternative on deer populations is expected to be insignificant (Table 5-1). A study on the effects of hunters with dogs on deer fertilization (Spencer 1986), reproductive and survival rates, found no significant effects and concluded that the use of dogs in hunting deer does not appear to affect the reproductive potential of deer populations. However, a study in Texas on the use of dogs for deer hunting, noted that deer densities were lower in dog-hunting areas than no-dog hunting areas (Spencer 1986). Because the study dealt with a different deer species (*Odocoilius virginianus*) under different management strategies, it's applicability to the situation in California is questionable.

There is evidence that deer hunted with dogs experience higher levels of stress than those hunted without dogs (Spencer 1986). However, this higher stress did not appear to have any consequences to the reproductive potential of these deer populations (Spencer 1986).

Although dogs are believed to increase the recovery rate of deer killed or wounded, there is very limited data to evaluate whether or not using dogs lowers the number of deer killed or wounded that are lost.

A ZONE ALTERNATIVES

The entire Zone A project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-2a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-2b.

Table 5-2a. A Zone Alternatives

Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone A	Tag range 30,000-65,000	Lengthen season to 51 consecutive days	Shorten season to 37 consecutive days
A-24	Tag range 25-200	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
A-25	Tag range 20-75	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-32	Tag range 50-300	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
G-8	Tag range 10-80 (military and general public)	Lengthen season to include 3 weekends	Shorten season to include 1 weekend
G-9	Tag quota 30 (15 military/ 15 general public)	No change	No change
G-11	Tag quota 500 (military and Department of Defense employees only)	No change	No change
G-21	Tag range 25-100	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
J-1	Tag range 10-25 (either-sex)	Lengthen season to 9 consecutive days	Modify bag to antlerless deer
J-10	Tag range 10-80 (military and general public)	Lengthen season to include 3 weekends	Shorten season to include 1 weekend

Table 5-2a. A Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
MA-1	Tag range 20-150	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
MA-3	Tag range 20-150	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
PLMs	Tag range: 50-150 buck, 5-100 antlerless, 50-150 either-sex	Tag range: 151-300 buck, 101-300 antlerless, 151-300	Tag range: 0-49 buck, 0-5 antlerless, 0-49 either-sex

Table 5-2b. A Zone Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	21	154,600	11,341	204	N/A	N/A
Proposed Project	21	145,520	11,341	203	8,152	5,704
Alt. 4 (HK)	19	145,520	13,290	338	6,203	5,569
Alt. 5 (LK)	23	145,520	9,569	42	9,924	5,865

B ZONE ALTERNATIVES

The entire Zone B project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-3a). Each is listed with features that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under Proposed Project. The effects of each of the alternatives for each of the B zones are presented in Tables 5-3b1 through 5-3b6.

Table 5-3a. B Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
B Zones	Tag range 35,000-65,000	Tag range 35,000-65,000	Tag range 35,000-65,000
Zone B-1	Season of 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days

Table 5-3a. B Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone B-2	Season of 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days
Zone B-3	Season of 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days
Zone B-4	Season of 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days
Zone B-5	Season of 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days
Zone B-6	Season of 30 consecutive days	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
A-30	Tag range 20-100	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
J-4	Tag range 15-50	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
M-11	Tag range 20-200	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
PLMs	Tag range: 150-350 buck; 50-200 antlerless; 50-200 either-sex	Tag range: 351-500 buck; 201-300 antlerless, 201-300 either-sex	Tag range: 10-149 buck, 10-49 antlerless, 10-49 either-sex

Table 5-3b1. Zone B-1 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	30	74,230	3,413	35	N/A	N/A
Proposed Project	30	57,960	3,413	35	1,547	1,288
Alt. 4 (HK)	28	57,960	4,167	50	793	1,273
Alt. 5 (LK)	32	57,960	2,778	7	2,182	1,316

Table 5-3b2. Zone B-2 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	46,440	2,876	0	N/A	N/A
Proposed Project	26	40,580	2,876	2	1,618	920
Alt. 4 (HK)	24	40,580	3,355	21	1,139	901
Alt. 5 (LK)	28	40,580	2,397	1	2,097	921

Table 5-3b3. Zone B-3 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	29	12,240	655	0	N/A	N/A
Proposed Project	29	9,850	655	0	702	220
Alt. 4 (HK)	27	9,850	783	0	574	220
Alt. 5 (LK)	31	9,850	527	0	830	220

Table 5-3b4. Zone B-4 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	29	7,770	611	0	N/A	N/A
Proposed Project	29	9,450	611	0	229	31
Alt. 4 (HK)	27	9,450	749	0	91	31
Alt. 5 (LK)	31	9,450	504	0	336	31

Table 5-3b5. Zone B-5 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	33	11,400	683	0	N/A	N/A
Proposed Project	33	10,380	683	6	319	132
Alt. 4 (HK)	31	10,380	765	11	237	127
Alt. 5 (LK)	35	10,380	546	2	456	136

Table 5-3b6. Zone B-6 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	15,990	1,268	0	N/A	N/A
Proposed Project	26	16,700	1,268	0	527	460
Alt. 4 (HK)	24	16,700	1,436	0	395	460
Alt. 5 (LK)	28	16,700	1,077	0	718	460

C ZONE ALTERNATIVES

The entire Zone C project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-4a). Each is listed with features that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under Proposed Project. The effects of each of the alternatives for each of the C zones are presented in Tables 5-4b1 through 5-4b4.

Table 5-4a. C Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
C Zone	Tag range 8,000-20,000	Tag range 20,001-25,000	Tag range 5,000-7,999
Zone C-1	Season beginning third Saturday in September and extending for 30 consecutive days	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days

Table 5-4a. C Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone C-2	Season beginning third Saturday in September and extending for 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days
Zone C-3	Season beginning third Saturday in September and extending for 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 30 consecutive days
Zone C-4	Season beginning third Saturday in September and extending for 16 consecutive days	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
A-1	Tag range 150-3,000	Lengthen seasons in zones C-1 and C-4 to 23 consecutive days	Shorten seasons in zones C-1 through C-4 to 9 consecutive days
G-1	Tag range 500-5,000 and 9 consecutive day season	Lengthen season to 16 consecutive days	Move 9 consecutive day season two weeks earlier
J-3	Tag range 15-30	Lengthen season to 9 consecutive days	Tag range 5-14
J-21	Tag range 20-80	Move season beginning two weeks later	Move season beginning two weeks earlier
PLMs	Tag range 50-100 buck, 5-50 antlerless, 5-50 either- sex	Tag range 101-300 buck, 51-100 antlerless, 51-100 either-sex	Tag range 5-49 buck, 0-4 antlerless, 0-4 either-sex

Table 5-4b1. Zone C-1 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	9	4,040	316	0	N/A	N/A
Proposed Project	9	2,800	316	0	21	7
Alt. 4 (HK)	9	2,800	318	0	19	7
Alt. 5 (LK)	12	2,800	264	0	73	7

Table 5-4b2. Zone C-2 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	15	3,880	301	0	N/A	N/A
Proposed Project	15	3,070	301	0	44	9
Alt. 4 (HK)	13	3,070	339	0	6	9
Alt. 5 (LK)	17	3,070	268	0	77	9

Table 5-4b3. Zone C-3 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	29	9,230	462	0	N/A	N/A
Proposed Project	29	7,500	462	2	308	29
Alt. 4 (HK)	27	7,500	517	16	253	13
Alt. 5 (LK)	31	7,500	390	0	380	31

Table 5-4b4. Zone C-4 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	21,520	1,351	0	N/A	N/A
Proposed Project	26	16,380	1,351	51	310	34
Alt. 4 (HK)	24	16,380	1,551	77	110	8
Alt. 5 (LK)	28	16,380	1,196	9	465	76

D ZONE ALTERNATIVES

COMBINED ZONES D-3, D-4, D-5

The entire combined zones D-3, D-4, D-5 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5, would include the following hunts (Table 5-5a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Tables 5-5b, 5-6a, and 5-7a.

Table 5-5a. D-3, D-4, D-5 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zones D-3, D-4, and D-5	Tag range 30,000-40,000	Tag range 30,000-40,000	Tag range 30,000-40,000
Zone D-3	Season beginning fourth Saturday in September and extending for 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 23 consecutive days
Zone D-4	Season beginning fourth Saturday in September and extending for 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 23 consecutive days
Zone D-5	Season beginning fourth Saturday in September and extending for 37 consecutive days	Lengthen season to 44 consecutive days	Shorten season to 23 consecutive days
G-7	20 military only tags	No change	No change
G-12	Tag range 25-75	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
G-19	Tag range 10-65	Tag range 66-100	Move season close date from December 31 to November 30
J-8	Tag range 10-20	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
J-9	Tag range 5-10	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
J-16	Tag range 10-75 and season concurrent with 37 day general season	Season beginning first Saturday in November and extending 37 consecutive days	Season beginning fourth Saturday in September and extending 23 consecutive days
J-17	Tag range 5-25 and season concurrent with 37 day general season	Season beginning first Saturday in November and extending 37 consecutive days	Season beginning fourth Saturday in September and extending 23 consecutive days

Table 5-5a. D-3, D-4, D-5 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
J-18	Tag range 10-75 and season concurrent with 37 day general season	Season beginning first Saturday in November and extending 37 consecutive days	Season beginning fourth Saturday in September and extending 23 consecutive days
PLMs	Tag range: 10-100 buck, 50-200 antlerless, 25-100 either-sex	Tag range: 101-200 buck, 201-300 antlerless, 101-200 either-sex	Tag range: 0-9 buck, 0-49 antlerless, 0-24 either-sex

Table 5-5b. Zone D-3 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	20,380	1,190	32	N/A	N/A
Proposed Project	26	14,830	1,190	32	424	123
Alt. 4 (HK)	24	14,830	1,372	78	242	77
Alt. 5 (LK)	28	14,830	1009	8	605	147

Table 5-5c. Zone D-4 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	5,800	298	8	N/A	N/A
Proposed Project	26	3,670	298	8	124	30
Alt. 4 (HK)	24	3,670	347	15	75	23
Alt. 5 (LK)	28	3,670	248	2	174	36

Table 5-5d. Zone D-5 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	37,270	2,129	16	N/A	N/A
Proposed Project	26	26,990	2,129	16	991	196
Alt. 4 (HK)	24	26,990	2,460	71	660	141
Alt. 5 (LK)	28	26,990	1,835	4	1,235	208

D-6 ZONE

The entire Zone D-6 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-8a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-8b.

Table 5-8a. D-6 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-6	Tag range 6,000-16,000	Lengthen season to 51 consecutive days	Shorten season to 37 consecutive days
A-21	Tag range 25-100	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
G-37	Tag range 25-50	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
J-15	Tag range 5-30	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days

Table 5-8b. Zone D-6 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	39	21,290	1,315	0	N/A	N/A
Proposed Project	39	21,820	1,315	0	1,019	218
Alt. 4 (HK)	37	21,820	1,485	0	849	218
Alt. 5 (LK)	41	21,820	1,061	0	1,273	218

D-7 ZONE

The entire Zone D-7 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-9a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-9b.

Table 5-9a. D-7 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-7	Tag range 4,000-10,000	Lengthen season to 51 consecutive days	Shorten season to 37 consecutive days

Table 5-9b. Zone D-7 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	19	20,860	1,204	0	N/A	N/A
Proposed Project	19	12,100	1,204	0	608	123
Alt. 4 (HK)	17	12,100	1,345	0	467	123
Alt. 5 (LK)	21	12,100	1,111	0	701	123

D-8 ZONE

The entire Zone D-8 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-10a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-10b.

Table 5-10a. D-8 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-8	Tag range 5,000-10,000	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
G-6	Tag range 25-100	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days

Table 5-10b. Zone D-8 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	20	9,570	533	0	N/A	N/A
Proposed Project	20	6,550	533	0	481	188
Alt. 4 (HK)	18	6,550	578	0	436	188
Alt. 5 (LK)	22	6,550	466	0	548	188

D-9 ZONE

The entire Zone D-9 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-11a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-11b.

Table 5-11a. D-9 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-9	Tag range 1,000-2,500	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days

Table 5-11b. Zone D-9 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	5,200	169	0	N/A	N/A
Proposed Project	26	2,070	169	0	84	32
Alt. 4 (HK)	24	2,070	191	0	62	32
Alt. 5 (LK)	28	2,070	144	0	109	32

D-10 ZONE

The entire Zone D-10 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-12a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-12b.

Table 5-12a. D-10 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-10	Tag range 400-800	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
PLMs	Tag range: 100-300 buck, 50-200 antlerless, 100-200 either-sex	Tag range: 301-400 buck, 201-300 antlerless, 201-300 either-sex	Tag range: 10-99 buck, 10-49 antlerless, 10-99 either-sex

Table 5-12b. Zone D-10 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	25	4,050	161	56	N/A	N/A
Proposed Project	25	2,380	161	56	204	61
Alt. 4 (HK)	23	2,380	190	58	175	59
Alt. 5 (LK)	27	2,380	117	15	248	102

D-12 ZONE

The entire Zone D-12 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-13a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-13b.

Table 5-13a. D-12 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-12	Tag range 100-1,500	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days

Table 5-13b. Zone D-12 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	1,380	137	0	N/A	N/A
Proposed Project	26	1,680	137	0	34	18
Alt. 4 (HK)	24	1,680	160	0	11	18
Alt. 5 (LK)	28	1,680	114	0	57	18

D-14 ZONE

The entire Zone D-14 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-14a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-14b.

Table 5-14a. D-14 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-14	Tag range 2,000-3,500	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
J-11	Tag range 10-50	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
PLMs	Tag range 10-20 buck	Tag range 21-30 buck	Tag range 0-9 buck

Table 5-14b. Zone D-14 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	19	1,740	167	4	N/A	N/A
Proposed Project	19	1,610	167	4	70	12
Alt. 4 (HK)	17	1,610	185	10	52	6
Alt. 5 (LK)	21	1,610	153	1	84	15

D-16 ZONE

The entire Zone D-16 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-15a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-15b.

Table 5-15a. D-16 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-16	Tag range 1,000-3,500	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
A-22	Tag range 100-1,000	Open the season on the last Saturday in August for 51 consecutive days	Eliminate second half of season
G-13	Tag range 50-300	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
M-6	Tag range 25-100	Open the season 2 weeks earlier on the first Saturday in December	Open season 1 week later on the fourth Saturday in December

Table 5-15b. Zone D-16 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	19	2,330	192	61	N/A	N/A
Proposed Project	19	1,760	192	61	29	29
Alt. 4 (HK)	17	1,760	218	81	3	9
Alt. 5 (LK)	17	1,760	170	18	51	72

D-17 ZONE

The entire Zone D-17 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-16a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-16b.

Table 5-16a. D-17 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-17	Tag range 100-800	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days

Table 5-16b. Zone D-17 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	820	82	0	N/A	N/A
Proposed Project	26	1,000	82	0	47	31
Alt. 4 (HK)	26	1,000	92	0	37	31
Alt. 5 (LK)	26	1,000	72	0	57	31

D-19 ZONE

The entire Zone D-19 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-17a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-17b.

Table 5-17a. D-19 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone D-19	Tag range 500-2,000	Lengthen season to 37 consecutive days	Shorten season to 23 consecutive days
J-14	Tag range 15-75	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days

Table 5-17b. Zone D-19 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	440	78	1	N/A	N/A
Proposed Project	26	950	78	1	45	9
Alt. 4 (HK)	24	950	88	5	35	5
Alt. 5 (LK)	28	950	67	0	56	10

D-11, D-13, and D-15 ZONE ALTERNATIVES

The combined D-11, D-13, and D-15 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-18a). Each is listed with features that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under Proposed Project. The effects of each of the alternatives for each of the three zones are presented in Tables 5-18b1 through 5-18b3.

Table 5-18a. D-11, D-13, and D-15 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
D-11	Tag range 2,500-6,000	Tag range 6,001-7,000	Tag range 1,500-2,499
D-13	Tag range 2,000-5,000	Tag range 5,001-6,000	Tag range 1,500-1,999
D-15	Tag range 500-2,000	Tag range 2,001-2,500	Tag range 100-499
D-11	Archery Season - First Saturday in September	Archery Season - Second Saturday in September	Archery Season -First Saturday in August
D-13	Archery Season - First Saturday in September	Archery Season - Second Saturday in September	Archery Season -First Saturday in August
D-15	Archery Season - First Saturday in September	Archery Season - Second Saturday in September	Archery Season -First Saturday in August
A-31	Tag range 200-2,000	Tag range 100-199	Tag range 2,000-2,500
G-10	Tag range 100-480 military only	Tag range 481-600 military only	Tag range 10-99 military only

Table 5-18a. D-11, D-13, and D-15 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
J-13	Tag range 25-100	Lengthen season to 15 consecutive days	Shorten season to 3 consecutive days
M-7	Tag range 50-150	Lengthen season to 23 consecutive days	Tag range 10-49
PLMs	Tag range: 50-100 buck, 50-200 antlerless, 50-300 either- sex	Tag range: 101-200 buck, 201-300 antlerless, 301-400 either-sex	Tag range: 10-49 buck, 10-49 antlerless, 10-49 either-sex

Table 5-18b1. Zone D-11 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	2,180	301	31	N/A	N/A
Proposed Project	26	3,440	301	31	99	23
Alt. 4 (HK)	24	3,440	329	45	71	9
Alt. 5 (LK)	28	3,440	249	9	151	45

Table 5-18b2. Zone D-13 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	13	6,960	270	18	N/A	N/A
Proposed Project	13	2,700	270	18	58	29
Alt. 4 (HK)	11	2,700	297	24	31	23
Alt. 5 (LK)	15	2,700	231	3	97	44

Table 5-18b3. Zone D-15 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	26	950	178	138	N/A	N/A
Proposed Project	26	1,600	178	138	36	52
Alt. 4 (HK)	24	1,600	207	182	7	8
Alt. 5 (LK)	28	1,600	124	26	90	164

X ZONE ALTERNATIVES

X-1 ZONE

The entire Zone X-1 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-19a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-19b.

Table 5-19a. X-1 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-1	Tag range 1,000-6,000	Move season opener 2 weeks later	Move season opener 2 weeks earlier
Section 554	Tag range 0-100		
A-3	Tag range 50-1,000	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
PLM	Tag range 5-10 buck	Tag range 11-20 buck	Tag range 1-4 buck

Table 5-19b. Zone X-1 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	16	6,980	539	0	N/A	N/A
Proposed Project	16	5,230	539	0	74	82
Alt. 4 (HK)	14	5,230	600	0	13	82
Alt. 5 (LK)	18	5,230	486	0	127	82

X-2 ZONE

The entire Zone X-2 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-20a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-20b.

Table 5-20a. X-2 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-2	Tag range 50-500	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-20		
A-4	Tag range 10-200	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-27	Tag range 5-75	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
M-9	Tag range 5-100	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
PLM	Tag range 5-10 buck	Tag range 11-20 buck	Tag range 1-4 buck

Table 5-20b. Zone X-2 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	20	700	66	0	N/A	N/A
Proposed Project	20	600	66	0	11	11
Alt. 4 (HK)	18	600	71	0	6	11
Alt. 5 (LK)	22	600	60	0	17	11

X-3A ZONE

The entire Zone X-3a project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-21a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-21b.

Table 5-21a. X-3a Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-3a	Tag range 150-1,500	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-50		
A-5	Tag range 10-300	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
PLM	Tag range: 10-50 buck, 10-100 antlerless	Tag range: 51-75 buck, 101-200 antlerless	Tag range: 1-9 buck, 1-9 antlerless

Table 5-21b. Zone X-3a Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	32	2,790	160	1	N/A	N/A
Proposed Project	32	2,130	160	1	61	31
Alt. 4 (HK)	30	2,130	187	21	34	11
Alt. 5 (LK)	34	2,130	136	3	85	29

X-3B ZONE

The entire Zone X-3b project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-22a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-22b.

Table 5-22a. X-3b Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-3b	Tag range 200-3,000	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-50		
A-6	Tag range 25-400	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
PLM	Tag range: 10-50 buck, 10-100 antlerless, 10-100 either-sex	Tag range: 51-75 buck, 101-200 antlerless, 101-200 either-sex	Tag range: 1-9 buck, 1-9 antlerless, 1-9 either-sex

Table 5-22b. Zone X-3b Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	37	4,100	334	0	N/A	N/A
Proposed Project	37	4,860	334	5	93	26
Alt. 4 (HK)	35	4,860	388	21	39	10
Alt. 5 (LK)	39	4,860	287	2	140	29

X-4 ZONE

The entire Zone X-4 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-23a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-23b.

Table 5-23a. X-4 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-4	Tag range 100-1,500	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-50		
A-7	Tag range 25-400	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
PLM	Tag range 5-10 buck	Tag range 11-20 buck	Tag range 1-4 buck

Table 5-23b. Zone X-4 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	27	2,070	151	0	N/A	N/A
Proposed Project	27	1,800	151	0	34	9
Alt. 4 (HK)	25	1,800	171	0	14	9
Alt. 5 (LK)	29	1,800	131	0	54	9

X-5A ZONE

The entire Zone X-5a project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-24a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-24b.

Table 5-24a. X-5a Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-5a	Tag range 50-300	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-20		
A-8	Tag range 15-100	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
M-4	Tag range 5-50	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
PLM	Tag range: 10-50 buck, 10-50 antlerless	Tag range: 51-75 buck, 51-200 antlerless	Tag range: 0-9 buck, 0-9 antlerless

Table 5-24b. Zone X-5a Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	45	700	26	0	N/A	N/A
Proposed Project	45	370	26	0	12	1
Alt. 4 (HK)	43	370	29	0	9	1
Alt. 5 (LK)	47	370	22	0	16	1

X-5B ZONE

The entire Zone X-5b project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-25a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-25b.

Table 5-25a. X-5b Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-5b	Tag range 50-800	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-20		
A-9	Tag range 10-100	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
M-5	Tag range 5-50	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days
PLM	Tag range: 10-75 buck, 10-100 antlerless	Tag range: 76-100 buck, 101-200 antlerless	Tag range: 0-9 buck, 0-9 antlerless

Table 5-25b. Zone X-5b Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	14	730	50	0	N/A	N/A
Proposed Project	14	540	50	2	24	6
Alt. 4 (HK)	12	540	54	3	20	6
Alt. 5 (LK)	16	540	45	1	29	6

X-6A ZONE

The entire Zone X-6a project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-26a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-26b.

Table 5-26a. X-6a Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-6a	Tag range 100-1,200	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
Section 554	Tag range 0-25		
A-11	Tag range 25-300	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-26	Tag range 10-100	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
M-8	Tag range 5-75	Lengthen season to 16 consecutive days	Shorten season to 2 consecutive days

Table 5-30b. Zone X-8 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	27	2,140	60	4	N/A	N/A
Proposed Project	27	770	60	4	33	12
Alt. 4 (HK)	25	770	71	6	22	12
Alt. 5 (LK)	29	770	51	0	42	12

X-9A ZONE

The entire Zone X-9a project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-31a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-31b.

Table 5-31a. X-9a Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-9a	Tag range 100-1,200	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-16	Tag range 50-750	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
G-39	Tag range 5-150 and 16 consecutive day season	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
J-12	Tag range 10-20	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days

Table 5-31b. Zone X-9a Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	38	3,900	283	0	N/A	N/A
Proposed Project	38	4,680	283	0	203	47
Alt. 4 (HK)	36	4,680	354	0	132	47
Alt. 5 (LK)	40	4,680	230	0	256	47

X-9B ZONE

The entire Zone X-9b project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-32a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-32b.

Table 5-32a. X-9b Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-9b	Tag range 100-600	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-17	Tag range 50-600	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
G-3	Tag range 5-50	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days

Table 5-32b. Zone X-9b Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	48	2,360	72	0	N/A	N/A
Proposed Project	48	1,600	72	0	137	32
Alt. 4 (HK)	46	1,600	87	0	122	32
Alt. 5 (LK)	50	1,600	57	0	152	32

X-9C ZONE

The entire Zone X-9c project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-33a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-33b.

Table 5-33a. X-9c Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-9c	Tag range 100-1,000	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-18	Tag range 50-500	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days

Table 5-33b. Zone X-9c Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	39	940	86	0	N/A	N/A
Proposed Project	39	1,480	86	0	62	23
Alt. 4 (HK)	37	1,480	103	0	45	23
Alt. 5 (LK)	41	1,480	65	0	83	23

X-10 ZONE

The entire Zone X-10 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-34a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-34b.

Table 5-34a. X-10 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-10	Tag range 200-600	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
A-19	Tag range 25-200	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days
G-38	Tag range 50-300	Lengthen season to 23 consecutive days	Shorten season to 9 consecutive days

Table 5-34b. Zone X-10 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	20	900	62	0	N/A	N/A
Proposed Project	20	810	62	0	49	19
Alt. 4 (HK)	18	810	72	0	39	19
Alt. 5 (LK)	22	810	53	0	58	19

X-12 ZONE

The entire Zone X-12 project, as proposed under the Proposed Project, Alternative 4, or Alternative 5 would include the following hunts (Table 5-35a). Each is listed with a feature of the hunt that should produce the desired effect within each alternative. Each hunt is described in detail in Chapter 1 under the Proposed Project. The effects of each of the alternatives are presented in Table 5-35b.

Table 5-35a. X-12 Zone Alternatives			
Hunts	Proposed Project (Desired kill)	Alternative 4 (High kill)	Alternative 5 (Low kill)
Zone X-12	Tag range 100-1,500	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days
A-20	Tag range 25-500	Lengthen season to 30 consecutive days	Shorten season to 16 consecutive days

Table 5-35b. Zone X-12 Expected Buck Ratio, Population Size, Hunter Kill and Harvest Buffer for Alternatives						
	Buck Ratio	Population	Hunter Kill		Harvest Buffer	
			Bucks	Does	Bucks	Does
2003	34	2,800	185	0	N/A	N/A
Proposed Project	34	3,540	185	0	227	121
Alt. 4 (HK)	32	3,540	226	0	186	121
Alt. 5 (LK)	36	3,540	144	0	268	121

CHAPTER 6. RESPONSES TO COMMENTS REGARDING THE PROPOSED PROJECT

In accordance with CEQA, Public input and agency consultation were encouraged during the environmental review process. A Notice of Preparation was provided to the State Clearinghouse, land management agencies having a key role in deer management, and all individuals and organizations which expressed an interest in deer management. The draft environmental document examined a variety of alternatives. The proposed project was recommended by the Department because it provided the public with the widest range of recreational opportunities related to deer populations, either state wide or locally. Every effort was made to avoid a biased analysis of issues. In general, the Department attempted to make the draft environmental document understandable to the public and to objectively summarize a large amount of technical information. The Department reviewed and summarized a great deal of scientific literature, which is cited in the document.

No comments regarding the draft environmental document were received.

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NOTE: All publications listed herein are available in public and/or college/university libraries. In addition, government agency publications/documents are available from the respective agency.

APPENDIX 2

Habitat Capability Model for Deer

CALIFORNIA WILDLIFE HABITAT RELATIONSHIPS SYSTEM
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SPECIES INFORMATION REPORT FOR MULE DEER
Odocoileus hemionus

TAXONOMY:
Class: MAMMALIA Order: ARTIODACTYLA
Family: CERVIDAE

IDENTIFICATION:
CWHR ID Code: M181 TNC ID Code: AMALC02010

LIFE HISTORY ATTRIBUTES:
Daily Activity Circadian Seasonal Activity Yearlong Migration: Local Migrator

SPECIAL STATUS: Harvest

SUBSPECIES: No Subs **STATUS**:

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SPECIES INFORMATION REPORT FOR : MULE DEER

LOCATIONS	SEASON IN LOCATION
BLM FIELD OFFICE	
ALTURAS	Yearlong
ARCATA	Yearlong
BAKERSFIELD	Yearlong
BARSTOW	Yearlong
BISHOP	Yearlong
EAGLE LAKE	Yearlong
EL CENTRO	Yearlong
FOLSOM	Yearlong
HOLLISTER	Yearlong
NEEDLES	Yearlong
PALM SPRINGS/SOUTH COAST	Yearlong
REDDING	Yearlong
RIDGECREST	Yearlong
SURPRISE	Yearlong
UKIAH	Yearlong
CERES BIOREGION	
BAY AREA/DELTA	Yearlong
SOUTH CENTRAL COAST	Yearlong
COLORADO DESERT	Yearlong
MODOC	Yearlong
MOJAVE	Yearlong
NORTH COAST/KLAMATH	Yearlong
SIERRA	Yearlong
SAN JOAQUIN VALLEY	Yearlong
SOUTH COAST	Yearlong
SACRAMENTO VALLEY	Yearlong
COUNTY	
ALAMEDA	Yearlong
ALPINE	Yearlong
AMADOR	Yearlong
BUTTE	Yearlong
CALAVERAS	Yearlong
CONTRA COSTA	Yearlong
COLUSA	Yearlong
DEL NORTE	Yearlong
EL DORADO	Yearlong
FRESNO	Yearlong
GLENN	Yearlong
HUMBOLDT	Yearlong

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SPECIES INFORMATION REPORT FOR : MULE DEER

LOCATIONS	SEASON IN LOCATION
IMPERIAL	Yearlong
INYO	Yearlong
KINGS	Yearlong
KERN	Yearlong
LAKE	Yearlong
LASSEN	Yearlong
LOS ANGELES	Yearlong
MADERA	Yearlong
MENDOCINO	Yearlong
MERCED	Yearlong
MONO	Yearlong
MONTEREY	Yearlong
MODOC	Yearlong
MARIPOSA	Yearlong
MARIN	Yearlong
NAPA	Yearlong
NEVADA	Yearlong
ORANGE	Yearlong
PLACER	Yearlong
PLUMAS	Yearlong
RIVERSIDE	Yearlong
SACRAMENTO	Yearlong
SANTA BARBARA	Yearlong
SAN BERNARDINO	Yearlong
SAN BENITO	Yearlong
SANTA CLARA	Yearlong
SANTA CRUZ	Yearlong
SAN DIEGO	Yearlong
SAN FRANCISCO	Yearlong
SHASTA	Yearlong
SIERRA	Yearlong
SISKIYOU	Yearlong
SAN JOAQUIN	Yearlong
SAN LUIS OBISPO	Yearlong
SAN MATEO	Yearlong
SOLANO	Yearlong
SONOMA	Yearlong
STANISLAUS	Yearlong
SUTTER	Yearlong
TEHAMA	Yearlong
TRINITY	Yearlong
TULARE	Yearlong
TUOLUMNE	Yearlong
VENTURA	Yearlong
YOLO	Yearlong
YUBA	Yearlong

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SPECIES INFORMATION REPORT FOR : MULE DEER

LOCATIONS	SEASON IN LOCATION
DFG REGION	
NORTHERN CALIFORNIA AND NORTH COAST	Yearlong
SACRAMENTO VALLEY AND CENTRAL SIERRA	Yearlong
CENTRAL COAST	Yearlong
SAN JOAQUIN VALLEY AND SOUTHERN SIERRA	Yearlong
SOUTH COAST	Yearlong
EASTERN SIERRA AND INLAND DESERTS	Yearlong
HYDROLOGIC REGION	
SAN FRANCISCO BAY	Yearlong
CENTRAL COAST	Yearlong
COLORADO RIVER	Yearlong
NORTH LAHONTAN	Yearlong
NORTH COAST	Yearlong
SACRAMENTO RIVER	Yearlong
SAN JOAQUIN	Yearlong
SOUTH LAHONTAN	Yearlong
SOUTH COAST	Yearlong
TULARE LAKE	Yearlong
LATILONG	
ALTURAS	Yearlong
ANNALPOLIS	Yearlong
AVAWATZ PASS	Yearlong
ATASCADERO	Yearlong
ANZA	Yearlong
BLYTHE	Yearlong
BISHOP	Yearlong
BUTTONWILLOW	Yearlong
CANTUA CREEK	Yearlong
CLARK MTN	Yearlong
CADIZ	Yearlong
DEEP CRATER	Yearlong
DESCANSO	Yearlong
DEATH VALLEY JCT	Yearlong
ELK CREEK	Yearlong
EUREKA	Yearlong
HAYFORK	Yearlong
HAWTHORNE	Yearlong
JOHANNESBURG	Yearlong
KLAMATH	Yearlong
LONG BEACH	Yearlong
LIDA	Yearlong

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SPECIES INFORMATION REPORT FOR : MULE DEER

LOCATIONS	SEASON IN LOCATION
LAKE HAVASU	Yearlong
LAKE ISABELLA	Yearlong
LIVERMORE	Yearlong
LOMPOC	Yearlong
MOKELUMNE HILL	Yearlong
MINERAL KING	Yearlong
MT LASSEN	Yearlong
NAPA	Yearlong
OROVILLE	Yearlong
PISGAH CRATER	Yearlong
PANAMENT SPR	Yearlong
REDDING	Yearlong
SANTA ANA MTNS	Yearlong
SANTA BARBARA	Yearlong
SANTA CRUZ	Yearlong
SAN DIEGO	Yearlong
SAN FRANCISCO	Yearlong
SIERRA CITY	Yearlong
SALINAS	Yearlong
SAN SIMEON	Yearlong
SOMES BAR	Yearlong
SONORA PASS	Yearlong
SALTON SEA	Yearlong
SACRAMENTO	Yearlong
SAUGUS	Yearlong
SUSANVILLE	Yearlong
TURLOCK LAKE	Yearlong
VISALIA	Yearlong
VICTORVILLE	Yearlong
WEED	Yearlong
WILLITS	Yearlong
YUMA	Yearlong
YOSEMITE VALLEY	Yearlong

NATIONAL FOREST	
ANGELES	Yearlong
CLEVELAND	Yearlong
EL DORADO	Yearlong
INYO	Yearlong
KLAMATH	Yearlong
LASSEN	Yearlong
LOS PADRES	Yearlong
LAKE TAHOE BASIN	Yearlong
MENDOCINO	Yearlong
MODOC	Yearlong
PLUMAS	Yearlong

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SPECIES INFORMATION REPORT FOR : MULE DEER

LOCATIONS	SEASON IN LOCATION
SAN BERNARDINO	Yearlong
SIERRA	Yearlong
STANISLAUS	Yearlong
SEQUOIA	Yearlong
SIX RIVERS	Yearlong
SHASTA-TRINITY	Yearlong
TAHOE	Yearlong
TOIYABE	Yearlong

USDA ECOREGION	
CENTRAL CALIFORNIA COAST	Yearlong
CENTRAL CALIFORNIA COAST RANGES	Yearlong
GREAT VALLEY	Yearlong
KLAMATH MOUNTAINS	Yearlong
MOJAVE DESERT	Yearlong
MONO	Yearlong
MODOC PLATEAU	Yearlong
NORTHERN CALIFORNIA COAST	Yearlong
NORTHERN CALIFORNIA INTERIOR COAST RANGES	Yearlong
NORTHERN CALIFORNIA COAST RANGES	Yearlong
NORTHWESTERN BASIN AND RANGE	Yearlong
SOUTHERN CALIFORNIA COAST	Yearlong
SOUTHERN CALIFORNIA MOUNTAINS AND VALLEYS	Yearlong
SOUTHEASTERN GREAT BASIN	Yearlong
SIERRA NEVADA	Yearlong
SIERRA NEVADA FOOTHILLS	Yearlong
SOUTHERN CASCADES	Yearlong
COLORADO DESERT	Yearlong
SONORAN DESERT	Yearlong

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
ALKALI DESERT SCRUB	Winter					
		SEEDLING SHRUB		-	-	low
		YOUNG SHRUB	MODRTE 40-59%	-	-	low
		YOUNG SHRUB	OPEN 25-39%	-	-	low
		YOUNG SHRUB	SPARSE 10-24%	-	-	low
		MATURE SHRUB	MODRTE 40-59%	-	low	low
		MATURE SHRUB	OPEN 25-39%	-	low	low
		MATURE SHRUB	SPARSE 10-24%	-	-	low
		DECADENT SHRUB	MODRTE 40-59%	-	low	low
		DECADENT SHRUB	OPEN 25-39%	-	low	low
		DECADENT SHRUB	SPARSE 10-24%	-	low	low
ALPINE DWARF-SHRUB	Summer					
		SEEDLING SHRUB		low	low	low
		YOUNG SHRUB	MODRTE 40-59%	low	med	high
		YOUNG SHRUB	OPEN 25-39%	low	low	high
		YOUNG SHRUB	SPARSE 10-24%	low	low	low
		MATURE SHRUB	MODRTE 40-59%	low	med	med
		MATURE SHRUB	OPEN 25-39%	low	med	med
		MATURE SHRUB	SPARSE 10-24%	low	low	high
		DECADENT SHRUB	MODRTE 40-59%	low	med	med
		DECADENT SHRUB	OPEN 25-39%	low	med	med
		DECADENT SHRUB	SPARSE 10-24%	low	low	med
ANNUAL GRASS	Yearlong					
		SHORT HERB	DENSE 60-100%	-	-	med
		SHORT HERB	MODRTE 40-59%	-	-	med
		SHORT HERB	OPEN 10-39%	-	-	low
		SHORT HERB	SPARSE 2-09%	-	-	low
		TALL HERB	DENSE 60-100%	low	low	med
		TALL HERB	MODRTE 40-59%	low	low	med
		TALL HERB	OPEN 10-39%	low	low	med
		TALL HERB	SPARSE 2-09%	-	-	low
ASPEN	Yearlong					
		SEEDLING TREE		low	low	high
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	med
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	med
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	med
		MED/LARGE TREE	MODRTE 40-59%	med	med	med
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	med
BITTERBRUSH	Winter					

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SEEDLING SHRUB		low	-	low
		YOUNG SHRUB	DENSE 60-100%	low	low	high
		YOUNG SHRUB	MODRTE 40-59%	low	low	high
		YOUNG SHRUB	OPEN 25-39%	low	low	high
		YOUNG SHRUB	SPARSE 10-24%	low	low	high
		MATURE SHRUB	DENSE 60-100%	low	med	high
		MATURE SHRUB	MODRTE 40-59%	low	med	high
		MATURE SHRUB	OPEN 25-39%	low	low	high
		MATURE SHRUB	SPARSE 10-24%	low	low	high
		DECADENT SHRUB	DENSE 60-100%	low	med	med
		DECADENT SHRUB	MODRTE 40-59%	low	med	med
		DECADENT SHRUB	OPEN 25-39%	low	med	med
		DECADENT SHRUB	SPARSE 10-24%	low	med	med
BLUE OAK WOODLAND	Yearlong					
		SEEDLING TREE		-	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	med	med	med
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
BLUE OAK-FOOTHILL PINE	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	high	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	low	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
CHAMISE-REDSHANK CHAPARRAL	Yearlong					
		SEEDLING SHRUB		low	low	low
		YOUNG SHRUB	DENSE 60-100%	med	med	low
		YOUNG SHRUB	MODRTE 40-59%	high	high	med
		YOUNG SHRUB	OPEN 25-39%	med	med	med
		YOUNG SHRUB	SPARSE 10-24%	low	low	med

SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		MATURE SHRUB	DENSE 60-100%	med	med	low
		MATURE SHRUB	MODRTE 40-59%	med	high	low
		MATURE SHRUB	OPEN 25-39%	med	med	low
		MATURE SHRUB	SPARSE 10-24%	low	low	low
		DECADENT SHRUB	DENSE 60-100%	low	med	low
		DECADENT SHRUB	MODRTE 40-59%	med	med	low
		DECADENT SHRUB	OPEN 25-39%	med	med	low
		DECADENT SHRUB	SPARSE 10-24%	low	low	low
CLOSED-CONE PINE-CYPRESS	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	med	high	med
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
COASTAL OAK WOODLAND	Yearlong					
		SEEDLING TREE			low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	med	med	med
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
COASTAL SCRUB	Yearlong					
		SEEDLING SHRUB		low	low	med
		YOUNG SHRUB	DENSE 60-100%	med	med	high
		YOUNG SHRUB	MODRTE 40-59%	high	high	high
		YOUNG SHRUB	OPEN 25-39%	med	med	high
		YOUNG SHRUB	SPARSE 10-24%	low	low	high
		MATURE SHRUB	DENSE 60-100%	med	med	med
		MATURE SHRUB	MODRTE 40-59%	high	high	med
		MATURE SHRUB	OPEN 25-39%	med	med	high
		MATURE SHRUB	SPARSE 10-24%	low	low	high
		DECADENT SHRUB	DENSE 60-100%	low	med	low

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		DECADENT SHRUB	MODRTE 40-59%	med	high	low
		DECADENT SHRUB	OPEN 25-39%	med	med	med
		DECADENT SHRUB	SPARSE 10-24%	low	low	med
DECIDUOUS ORCHARD	Yearlong					
		SEED/SAPLING TREE		-	-	med
DESERT RIPARIAN	Yearlong					
		SEEDLING TRE/SHRB		low	low	med
		SMALL TREE/SHRUB	DENSE 60-100%	low	med	low
		SMALL TREE/SHRUB	MODRTE 40-59%	med	med	low
		SMALL TREE/SHRUB	OPEN 10-39%	med	med	med
		SMALL TREE/SHRUB	SPARSE 2-09%	med	med	med
		MEDIUM TREE/SHRUB	DENSE 60-100%	low	high	low
		MEDIUM TREE/SHRUB	MODRTE 40-59%	low	med	low
		MEDIUM TREE/SHRUB	OPEN 10-39%	med	med	med
		MEDIUM TREE/SHRUB	SPARSE 2-09%	med	med	med
		LARGE TREE	DENSE 60-100%	low	high	low
		LARGE TREE	MODRTE 40-59%	low	med	low
		LARGE TREE	OPEN 10-39%	med	med	med
		LARGE TREE	SPARSE 2-09%	med	med	med
DESERT SCRUB	Winter					
		SEEDLING SHRUB		-	-	low
		YOUNG SHRUB	MODRTE 40-59%	-	-	low
		YOUNG SHRUB	OPEN 25-39%	-	-	low
		YOUNG SHRUB	SPARSE 10-24%	-	-	low
		MATURE SHRUB	MODRTE 40-59%	-	low	low
		MATURE SHRUB	OPEN 25-39%	-	low	low
		MATURE SHRUB	SPARSE 10-24%	-	-	low
		DECADENT SHRUB	MODRTE 40-59%	-	low	low
		DECADENT SHRUB	OPEN 25-39%	-	low	low
		DECADENT SHRUB	SPARSE 10-24%	-	low	low
DESERT SUCCULENT SHRUB	Winter					
		SEEDLING SHRUB		-	-	low
		YOUNG SHRUB	MODRTE 40-59%	-	-	low
		YOUNG SHRUB	OPEN 25-39%	-	-	low
		YOUNG SHRUB	SPARSE 10-24%	-	-	low
		MATURE SHRUB	MODRTE 40-59%	-	low	low
		MATURE SHRUB	OPEN 25-39%	-	low	low
		MATURE SHRUB	SPARSE 10-24%	-	-	low
		DECADENT SHRUB	MODRTE 40-59%	-	low	low
		DECADENT SHRUB	OPEN 25-39%	-	low	low
		DECADENT SHRUB	SPARSE 10-24%	-	low	low
DESERT WASH	Winter					
		SEEDLING TRE/SHRB		-	-	low
		SMALL TREE/SHRUB	DENSE 60-100%	-	-	low
		SMALL TREE/SHRUB	MODRTE 40-59%	-	-	low
		SMALL TREE/SHRUB	OPEN 10-39%	-	-	low
		SMALL TREE/SHRUB	SPARSE 2-09%	-	-	low
		MEDIUM TREE/SHRUB	DENSE 60-100%	low	low	low
		MEDIUM TREE/SHRUB	MODRTE 40-59%	low	low	low
		MEDIUM TREE/SHRUB	OPEN 10-39%	low	low	low
		MEDIUM TREE/SHRUB	SPARSE 2-09%	-	-	low
		LARGE TREE	DENSE 60-100%	low	low	-
		LARGE TREE	MODRTE 40-59%	low	low	low

SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		LARGE TREE	OPEN 10-39%	low	low	low
		LARGE TREE	SPARSE 2-09%	low	low	low
DOUGLAS-FIR	Yearlong					
		SEEDLING TREE		low	low	high
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low
DRYLAND GRAIN CROPS	Yearlong			-	-	med
EASTSIDE PINE	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	med	med	med
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
EUCALYPTUS	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	low	low
		SAPLING TREE	MODRTE 40-59%	low	low	low
		SAPLING TREE	OPEN 25-39%	low	low	med
		SAPLING TREE	SPARSE 10-24%	low	low	med
		POLE TREE	DENSE 60-100%	low	low	low
		POLE TREE	MODRTE 40-59%	med	low	low
		POLE TREE	OPEN 25-39%	low	low	med
		POLE TREE	SPARSE 10-24%	low	low	med
		SMALL TREE	DENSE 60-100%	low	low	low
		SMALL TREE	MODRTE 40-59%	low	low	low
		SMALL TREE	OPEN 25-39%	low	low	med

SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SMALL TREE	SPARSE 10-24%	low	low	med
		MED/LARGE TREE	DENSE 60-100%	low	low	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	low	low	med
		MED/LARGE TREE	SPARSE 10-24%	low	low	med
EVERGREEN ORCHARD	Yearlong					
		SEED/SAPLING TREE		-	-	med
FRESH EMERGENT WETLAND	Yearlong					
		SHORT HERB	DENSE 60-100%	-	low	low
		SHORT HERB	MODRTE 40-59%	-	low	low
		SHORT HERB	OPEN 10-39%	-	low	low
		SHORT HERB	SPARSE 2-09%	-	low	low
		TALL HERB	DENSE 60-100%	-	low	low
		TALL HERB	MODRTE 40-59%	-	low	low
		TALL HERB	OPEN 10-39%	-	low	low
		TALL HERB	SPARSE 2-09%	-	low	low
IRRIGATED GRAIN CROPS	Yearlong					
				-	-	med
IRRIGATED HAYFIELD	Yearlong					
				-	-	med
IRRIGATED ROW AND FIELD CROPS	Yearlong					
				-	-	med
JEFFREY PINE	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	med	high	med
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
JOSHUA TREE	Winter					
		SEEDLING TREE		-	-	low
		SMALL TREE	MODRTE 40-59%	-	low	-
		SMALL TREE	OPEN 25-39%	-	low	low
		SMALL TREE	SPARSE 10-24%	-	-	low
		LARGE TREE	MODRTE 40-59%	-	low	-
		LARGE TREE	OPEN 25-39%	-	low	low
		LARGE TREE	SPARSE 10-24%	-	-	low
JUNIPER	Yearlong					

SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SEEDLING TREE		low	low	high
		SAPLING TREE	DENSE 60-100%	med	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	low
		SAPLING TREE	OPEN 25-39%	med	med	high
		SAPLING TREE	SPARSE 10-24%	low	low	high
		POLE TREE	DENSE 60-100%	med	med	low
		POLE TREE	MODRTE 40-59%	med	med	med
		POLE TREE	OPEN 25-39%	med	med	high
		POLE TREE	SPARSE 10-24%	low	low	high
		SMALL TREE	DENSE 60-100%	med	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	low	low	high
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	med
		MED/LARGE TREE	OPEN 25-39%	med	med	high
		MED/LARGE TREE	SPARSE 10-24%	low	low	high
KLAMATH MIXED CONIFER	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low
LODGEPOLE PINE	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	med	high	med
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
LOW SAGE	Winter					

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SEEDLING SHRUB		-	-	low
		YOUNG SHRUB	MODRTE 40-59%	-	-	med
		YOUNG SHRUB	OPEN 25-39%	-	-	med
		YOUNG SHRUB	SPARSE 10-24%	-	-	med
		MATURE SHRUB	MODRTE 40-59%	low	low	med
		MATURE SHRUB	OPEN 25-39%	low	low	med
		MATURE SHRUB	SPARSE 10-24%	low	low	med
		DECADENT SHRUB	MODRTE 40-59%	low	low	low
		DECADENT SHRUB	OPEN 25-39%	low	low	low
		DECADENT SHRUB	SPARSE 10-24%	low	low	low
MIXED CHAPARRAL	Yearlong					
		SEEDLING SHRUB		low	low	med
		YOUNG SHRUB	DENSE 60-100%	med	med	high
		YOUNG SHRUB	MODRTE 40-59%	high	high	high
		YOUNG SHRUB	OPEN 25-39%	med	med	high
		YOUNG SHRUB	SPARSE 10-24%	low	low	high
		MATURE SHRUB	DENSE 60-100%	med	med	med
		MATURE SHRUB	MODRTE 40-59%	high	high	med
		MATURE SHRUB	OPEN 25-39%	med	med	high
		MATURE SHRUB	SPARSE 10-24%	low	low	high
		DECADENT SHRUB	DENSE 60-100%	low	med	low
		DECADENT SHRUB	MODRTE 40-59%	med	med	low
		DECADENT SHRUB	OPEN 25-39%	med	med	med
		DECADENT SHRUB	SPARSE 10-24%	low	low	med
MONTANE CHAPARRAL	Yearlong					
		SEEDLING SHRUB		low	low	med
		YOUNG SHRUB	DENSE 60-100%	med	med	high
		YOUNG SHRUB	MODRTE 40-59%	high	high	high
		YOUNG SHRUB	OPEN 25-39%	med	med	high
		YOUNG SHRUB	SPARSE 10-24%	low	low	high
		MATURE SHRUB	DENSE 60-100%	med	med	med
		MATURE SHRUB	MODRTE 40-59%	high	high	med
		MATURE SHRUB	OPEN 25-39%	med	med	high
		MATURE SHRUB	SPARSE 10-24%	low	low	high
		DECADENT SHRUB	DENSE 60-100%	low	med	low
		DECADENT SHRUB	MODRTE 40-59%	med	high	low
		DECADENT SHRUB	OPEN 25-39%	med	med	med
		DECADENT SHRUB	SPARSE 10-24%	low	low	med
MONTANE HARDWOOD	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med

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Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
MONTANE HARDWOOD-CONIFER	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low
MONTANE RIPARIAN	Yearlong					
		SEEDLING TREE		low	low	high
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	med
		MED/LARGE TREE	MODRTE 40-59%	med	low	med
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low
PALM OASIS	Winter					
		SEEDLING TREE		-	-	low
		SMALL TREE	DENSE 60-100%	-	low	low
		SMALL TREE	MODRTE 40-59%	-	low	low
		SMALL TREE	OPEN 25-39%	-	low	low
		SMALL TREE	SPARSE 10-24%	-	-	low
		LARGE TREE	DENSE 60-100%	-	low	low
		LARGE TREE	MODRTE 40-59%	-	low	low
		LARGE TREE	OPEN 25-39%	-	low	low
		LARGE TREE	SPARSE 10-24%	-	-	low
PASTURE	Yearlong					
				low	low	med
PERENNIAL GRASS	Yearlong					
		SHORT HERB	DENSE 60-100%	-	-	med

SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SHORT HERB	MODRTE 40-59%	-	-	med
		SHORT HERB	OPEN 10-39%	-	-	low
		SHORT HERB	SPARSE 2-09%	-	-	low
		TALL HERB	DENSE 60-100%	low	low	med
		TALL HERB	MODRTE 40-59%	low	low	med
		TALL HERB	OPEN 10-39%	low	low	med
		TALL HERB	SPARSE 2-09%	-	-	low
PINYON-JUNIPER	Yearlong					
		SEEDLING TREE		low	low	high
		SAPLING TREE	DENSE 60-100%	med	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	low
		SAPLING TREE	OPEN 25-39%	med	med	high
		SAPLING TREE	SPARSE 10-24%	low	low	high
		POLE TREE	DENSE 60-100%	med	med	low
		POLE TREE	MODRTE 40-59%	med	med	med
		POLE TREE	OPEN 25-39%	med	med	high
		POLE TREE	SPARSE 10-24%	low	low	high
		SMALL TREE	DENSE 60-100%	med	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	low	low	high
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	med
		MED/LARGE TREE	OPEN 25-39%	med	med	high
		MED/LARGE TREE	SPARSE 10-24%	low	low	high
PONDEROSA PINE	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	med	high	med
		POLE TREE	SPARSE 10-24%	high	med	high
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
RED FIR	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	med	high	med
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
REDWOOD	Yearlong					
		SEEDLING TREE		low	low	high
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	high
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low
SAGEBRUSH	Yearlong					
		SEEDLING SHRUB		-	-	low
		YOUNG SHRUB	DENSE 60-100%	-	low	med
		YOUNG SHRUB	MODRTE 40-59%	-	low	med
		YOUNG SHRUB	OPEN 25-39%	-	low	med
		YOUNG SHRUB	SPARSE 10-24%	-	low	med
		MATURE SHRUB	DENSE 60-100%	low	med	med
		MATURE SHRUB	MODRTE 40-59%	low	med	med
		MATURE SHRUB	OPEN 25-39%	low	low	med
		MATURE SHRUB	SPARSE 10-24%	low	low	med
		DECADENT SHRUB	DENSE 60-100%	low	med	low
		DECADENT SHRUB	MODRTE 40-59%	low	med	low
		DECADENT SHRUB	OPEN 25-39%	low	med	low
		DECADENT SHRUB	SPARSE 10-24%	low	med	low
SIERRAN MIXED CONIFER	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low
SUBALPINE CONIFER	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	med	high	med
		SMALL TREE	DENSE 60-100%	low	med	low
		SMALL TREE	MODRTE 40-59%	med	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
URBAN	Yearlong					
				low	low	med
VALLEY FOOTHILL RIPARIAN	Yearlong					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	high
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	high	low
		MED/LARGE TREE	MODRTE 40-59%	low	low	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
VALLEY OAK WOODLAND	Yearlong					
		SEEDLING TREE		-	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	high

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SPECIES INFORMATION REPORT FOR : MULE DEER

Habitat Suitabilities

Habitat	Season	Size/Age Class	Canopy Closure	Importance to ..... Repro	Cover	Feeding
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	med	med	med
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
VINEYARD	Yearlong			-	-	med
WET MEADOW	Yearlong					
		SHORT HERB	DENSE 60-100%	-	-	med
		SHORT HERB	MODRTE 40-59%	-	-	med
		SHORT HERB	OPEN 10-39%	-	-	low
		SHORT HERB	SPARSE 2-09%	-	-	low
		TALL HERB	DENSE 60-100%	low	low	med
		TALL HERB	MODRTE 40-59%	low	low	med
		TALL HERB	OPEN 10-39%	low	low	med
		TALL HERB	SPARSE 2-09%	-	low	low
WHITE FIR	Summer					
		SEEDLING TREE		low	low	med
		SAPLING TREE	DENSE 60-100%	low	med	low
		SAPLING TREE	MODRTE 40-59%	med	med	med
		SAPLING TREE	OPEN 25-39%	high	med	high
		SAPLING TREE	SPARSE 10-24%	high	med	high
		POLE TREE	DENSE 60-100%	low	high	low
		POLE TREE	MODRTE 40-59%	med	high	med
		POLE TREE	OPEN 25-39%	high	med	high
		POLE TREE	SPARSE 10-24%	high	med	med
		SMALL TREE	DENSE 60-100%	low	high	low
		SMALL TREE	MODRTE 40-59%	high	med	med
		SMALL TREE	OPEN 25-39%	med	med	med
		SMALL TREE	SPARSE 10-24%	med	med	med
		MED/LARGE TREE	DENSE 60-100%	low	med	low
		MED/LARGE TREE	MODRTE 40-59%	med	med	low
		MED/LARGE TREE	OPEN 25-39%	med	med	med
		MED/LARGE TREE	SPARSE 10-24%	med	med	med
		MULTI-LAYERD TREE		low	med	low

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SPECIES INFORMATION REPORT FOR : MULE DEER

Specific Habitat Elements

AQUATIC ELEMENTS	DECAY CLASS	IMPORTANCE TO ..... REPRO	COVER	FEEDING
WATER		-	-	preferred
VERNAL POOLS		-	-	preferred
PONDS		-	-	preferred
LAKES		-	-	preferred
STREAMS, INTERMITTENT		-	-	preferred
STREAMS, PERMANENT		-	-	preferred
RIVERS		-	-	preferred
SPRINGS		-	-	preferred
SPRINGS, MINERAL		-	-	preferred
BOGS		-	-	preferred

HABITAT EDGE ELEMENTS	DECAY CLASS	IMPORTANCE TO ..... REPRO	COVER	FEEDING
TREE/SHRUB		essential	essential	secondary
TREE/GRASS		preferred	preferred	preferred
TREE/WATER		preferred	preferred	preferred
TREE/AGRICULTURE		preferred	preferred	preferred
SHRUB/GRASS		secondary	secondary	secondary
SHRUB/WATER		preferred	preferred	preferred
SHRUB/AGRICULTURE		preferred	preferred	preferred
GRASS/WATER		-	-	preferred
GRASS/AGRICULTURE		-	-	preferred
WATER/AGRICULTURE		-	-	preferred

HUMAN ELEMENTS	DECAY CLASS	IMPORTANCE TO ..... REPRO	COVER	FEEDING
WATER, CREATED BODY		-	-	preferred

LIVE VEGETATIVE COVER	DECAY CLASS	IMPORTANCE TO ..... REPRO	COVER	FEEDING
LAYER, TREE		preferred	secondary	preferred
LAYER, SHRUB		secondary	secondary	secondary
LAYER, HERBACEOUS		-	-	preferred
TREES, HARDWOOD		preferred	preferred	preferred
RIPARIAN INCLUSION		preferred	preferred	preferred

VEGETATIVE DIET ELEMENTS	DECAY CLASS	IMPORTANCE TO ..... REPRO	COVER	FEEDING
FUNGI		-	-	preferred
GRAMINOIDS		-	-	preferred
FORBS		-	-	secondary

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SPECIES INFORMATION REPORT FOR : MULE DEER

Specific Habitat Elements

SHRUBS	-	-	essential
TREE LEAVES	-	-	preferred
ACORNS	-	-	secondary
BERRIES	-	-	preferred
FRUITS	-	-	preferred

APPENDIX 3

Memorandum of Understanding
Between the
Nevada Department of Wildlife
and the
California Department of Fish and Game

Re: The Cooperative Management of Interstate
Mule Deer Herds

MEMORANDUM OF UNDERSTANDING

Between the

California Department of Fish & Game

And the

Nevada Division of Wildlife

Regarding:

COOPERATIVE MANAGEMENT OF INTERSTATE MULE DEER HERDS

This Memorandum of Understanding (MOU) revises an original MOU created between the California Department of Fish & Game (hereinafter referred to as CDFG) and the Nevada Division of Wildlife (hereinafter referred to as NDOW) and signed by their respective agency directors on February 23rd, 1990.

WITNESSETH:

WHEREAS, interstate mule deer herds, herein defined as those populations of mule deer occupying summer ranges within portions of California and occupying winter ranges wholly or partially within portions of Nevada, occur from the states' mutual border with the state of Oregon south to the White Mountains, encompassing nine deer management zones in California and five deer management areas in Nevada.

WHEREAS, both the CDFG and NDOW have statutory authority to manage their respective publics' wildlife resources, including mule deer, within their respective states. It is the policy of these agencies to encourage the conservation, restoration, maintenance and utilization of wild deer populations, including sport hunting.

WHEREAS, coordinated management of interstate mule deer herds is necessary if the goals presented in the preceding paragraph are to be met. This MOU outlines general management objectives for interstate herds and general management procedures to be cooperatively utilized by the agencies in order to accomplish those objectives.

NOW THEREFOR, it is mutually agreed and understood as follows:

A. <u>MANAGEMENT OBJECTIVES</u> – The objectives listed in this section should be attained in order to manipulate herd structure toward a composition that promotes population vigor and desirable levels of use.

1. **Population Estimates:** The CDFG and NDOW shall mutually establish annual deer herd population estimates. Representatives of each state will meet annually to jointly develop these population estimates.

2. **Post-season Buck Ratios: The** CDFG & NDOW shall establish buck and antlerless harvest goals designed to achieve and maintain mutually agreed-upon post-season buck ratio objectives (PSBRO). A general goal is to establish a desired minimum ratio of 20♂/100♀.

3. **Distribution of Harvest: The** CDFG & NDOW shall establish an equitable distribution of the *desired buck kill (**DBK**)* and the *desired antlerless kill (**DDK**)* for each defined herd. The determination of this equitable distribution shall be made through mutual analysis by the states' respective field, regional and staff level biologists using the best available data such as range delineation studies and historic harvest data from both states.

4. **Tag Quotas:** The CDFG & NDOW shall develop tag quota recommendations for each hunt zone or unit. Each state shall determine these figures by applying their respective tag allocation policies to their apportioned DBK and DDK values. These quota recommendations shall be presented to the states' respective Wildlife Commission boards for final authorization.

B. **PROCEDURES:** The CDFG & NDOW shall cooperatively implement the following procedures in order to accomplish the management goals listed in the previous section.

1. **Mutual Data Collection:** Mule deer herd composition data shall be collected each fall and spring for each defined population by striving to have a survey team consisting of at least one representative of each agency. Attendance by the zone/unit biologist of each agency encourages mutual interpretation of the recorded data through discussion of their shared experience.

   a. *Post-season surveys* – The CDFG shall assume the responsibility of coordinating the collection of post-season composition data. This has traditionally been accomplished through the use of a helicopter; however, ground surveys may be required on occasion.

   b. *Spring surveys* - The NDOW shall assume the responsibility of coordinating the collection of spring composition data. This has traditionally been accomplished through the use of a helicopter; however, ground surveys may be required on occasion.

   c. Zone/unit biologists of the state agency bearing the coordination responsibility for a particular survey shall organize details of the survey with their counterpart in the other state agency.

   d. Authors of survey narratives shall provide copies of these reports to their counterpart(s) in the other state.

2. **Survey Time Frames: Surveys** shall be conducted within a seasonal time frame that allows for the collection of an adequate sample that the biologists confidently feel represents the population as a whole.

a. *Post-season surveys* – The post-season survey shall follow the conclusion of the Nevada general season in most cases. The date of the survey should not exceed the 10th of January. The timing of this survey is based upon the assumptions that 1.) the majority of the herd has completed migration to winter range, and 2.) antler drop occurring in January would compromise accurate measurement of the buck ratio, and 3.) the point in time precedes the period when winter fawn mortality commences.

b. *Spring surveys* – The spring survey will be conducted within a time frame between February 25th and March 25th. The timing of this survey is based upon the assumption that 1.) the majority of the herd is still present on winter range, and 2.) winter fawn loss is nearly at an end; thus the observed fawn ratio is accurate representation. The latter date ensures that the data will be available for the interstate meeting.

3. **Population Estimates:** The method used to determine annual population estimates for a given herd shall be determined by agreement among the two states' field, regional and staff level biologists. This process shall have standard application to all interstate herds. If an agreement cannot be reached by these biologists, then the final decision shall be made through agreement between the Wildlife Management Division Chief and the appropriate Regional Manager of each state.

4. **Supplemental Data Collection:** Projects proposed or implemented by either state that are designed to obtain additional or supplemental data attendant to the interstate deer herd(s) shall be coordinated with the other state. The project proponent is responsible for contacting the other state. Examples of such projects include range delineation studies, fecundity and animal condition studies and hunter survey studies.

5. **Input to Land Management Agencies:** CDFG and NDOW representatives are only responsible for commenting upon land management agencies' proposed land use actions that would affect interstate deer herds within their own respective states. As a courtesy, these representatives should coordinate their input with their counterpart in the other state.

6. **Annual Coordination Meeting:** The CDFG and NDOW shall meet annually to produce population estimates and determine harvest quotas for each interstate herd and to discuss issues pertinent to mule deer management. Participants may include zone/unit biologists, supervisors, Regional Managers and staff level personnel. The CDFG shall host the meeting during the even-numbered years and the NDOW shall host the meeting during the odd-numbered years. The host shall select the meeting place and prepare the agenda.

This agreement shall remain in effect until amended with the concurrence of both agencies or terminated by either agency after thirty (30) days written notice.

MEMORANDUM OF UNDERSTANDING

Between the
California Department of Fish & Game and the Nevada Division of Wildlife
Regarding:

COOPERATIVE MANAGEMENT OF INTERSTATE MULE DEER HERDS

Signatory:

Robert C. Hight

Date: 8-18-00

Robert Hight, Director
California Department of Fish & Game

Terry R. Crawforth

Date: 8-11-00

Terry Crawforth, Administrator
Nevada Division of Wildlife

APPENDIX 4

Users Manual for CIR
(A Statistical Computer Model for Estimating Deer Numbers)

Prepared By:
Doug Updike
California Department of Fish and Game
Wildlife Programs Branch
Sacramento, California 95814

USERS MANUAL FOR CIR
(A Statistical Computer Model For Estimating Deer Numbers)

BACKGROUND

Deer hunting strategies and hunting regulations in California are based upon recommendations contained in individual deer herd management plans. With the predominately buck only strategy in the State, the herd plan objective for buck ratio is the only population parameter which is managed by hunting. Therefore, the harvest level for buck hunting throughout the State needs to be monitored and compared to the local herd plan objective for buck ratio to determine if the current hunting strategy is appropriate for the herd status. As buck ratios fall below plan objective levels, the hunting strategy needs to be altered to manage the proportion of buck in the herd at the desired level.

Some places in California have local deer populations or herds which receive unusually heavy buck harvest pressure. This situation exists because the habitat is relatively open and has little hiding cover when compared to areas with heavy timber cover (eg. west slope of the Sierra Nevada Mountains) or brush cover (eg. coastal chaparral vegetation types). Consequently, the hunter in the field is able to view deer from long distances and can harvest them with relative ease. These herds tend to exhibit low proportions of bucks in the herd with buck only hunting strategies. Post-season buck ratios will commonly range less than 15 bucks per 100 does with unrestricted hunter numbers. Most areas with deer herds which fit this situation are designated as X-zones.

The unique sensitivity of the buck ratios of the deer herds in the X-zones warrants a hunting strategy which can provide predictable numbers of harvested animals. Hunter numbers are limited in X-zones during the general deer hunting season by a quota. The basis for the quota is that the demand for hunting in the X-zones and the number of bucks which would be harvested by the hunters exceeds the number of extra bucks in the herd. The desired post-season proportion of bucks (ie. the buck ratio) stated in most X-zone deer herd management plans is 20 to 30 per 100 does. The quota is designed to balance hunter harvest with herd performance and maintain the objective buck ratio for the herd or zone. The quota for any particular X-zone will increase if fawn survival was good the previous year and the buck carry-over is high.

The remainder of this paper describes how to use the statistical computer model (CIR) employed by the Department to estimate the number of bucks to harvest in X-zones during a given hunting season. Methods for calculating population sizes and the number of bucks in the herd using changes in sex and age ratios have been investigated by the variety of individuals (Kelker, 1940 an 1943; Allen, 1942; Riordan, 1948; Petrides, 1949; Lauckhart, 1950; dasmann, 1952; and

Selleck and Hart, 1957). The procedure described below is a modification of the method reported by Selleck and Hart (1957).

PROCEDURE

The statistical model (CIR) is a compilation of formulas in a worksheet file to be used in Lotus 1,2,3 (Lotus Development Corp.). The basic field data which are required inputs to the model include the following:

Herd Parameter	units
Reported Harvest (bucks and does)	animals
Percent Unreported Harvest	% of harvest
Percent Crippling and Illegal Loss	% of harvest
Last Fall Herd Composition Data	
Buck Ratio	bucks per 100 does
Fawn Ratio	fawns per 100 does
Last Spring Fawn Ratio	fawns per 100 does
Previous Fall Buck Ratio	bucks per 100 does
Percent Over-winter Fawns Loss	%
Hunter Success Rate	%
Desired Post-season Buck Ratio	bucks per 100 does

The basic Selleck-Hart formulas used in the procedure are:

1. $\frac{B-A}{K-A}$ _ Decimal fraction of adult does killed.

2. $\frac{K*(B-A)}{B*(K-A)}$ _ Decimal fraction of bucks killed.

3. $\frac{K+100*(B-A)}{B+100*(K-A)}$ _ Decimal fraction of the total adult population killed.

where: B - Pre-season bucks per 100 does
K - Ratio of the bucks per 100 does in the harvest
A - Post-season bucks per 100 does

The 14 first columns of the model are for data entry, and the remaining portion of the spreadsheet contains the formulas needed to estimate the size of the sex and age class components of the deer population and the number of hunting tags which should be provided during the next season to attain or maintain the desired proportion of bucks in the population.

To facilitate data entry, the discussion of input variables and calculations are designated below in the column format of Lotus 1,2,3. To run the model, retrieve

the spreadsheet file CIR.WK1 in the Lotus 1,2,3 worksheet and follow the steps described below.

Data entry:

column

A Type the hunt zone designation.

B Enter reported buck harvest. This should be based upon returned deer hunting tags.

C Enter the percent unreported buck harvest. These data are often gathered by noting the proportion of locker plant deer which are not returned in the mail. The value usually ranges from 0 to 30 percent.

D Enter the percent crippling and illegal buck loss. These data are usually field data which may be higher in zones with 3 point or better buck bag limits.

E Enter the number of other bucks which were removed from the population in a disproportionate fashion relative to the doe segment. These data are usually the number of bucks harvested by another state.

F Enter reported doe harvest. This should be based upon returned deer hunting tags.

G Enter the percent unreported doe harvest. These data are often gathered by noting the proportion of locker plant deer which are not returned in the mail. The value usually ranges from 0 to 30 percent.

H Enter the number of other does which were removed from the population in a disproportionate fashion relative to the doe segment. These data are usually the number of does harvested by another state.

I Enter the fawn ratio (fawns per 100 does) from the previous spring herd composition counts.

J Enter the fawn ratio (fawns per100 does) from the past fall herd composition counts.

K Enter the buck ratio (bucks per 100 does) from the past fall herd composition counts.

L Enter the expected percentage of fawns which will be lost over the current winter period. The model assumes that the population estimate is needed

during the time of just prior to submitting proposals to the Fish and Game Commission (February) for changing deer hunting regulations. If the model is being run after spring herd composition counts are conducted, then enter the over-winter fawn loss value which would calculate (in column "O") the observed spring fawn ratio.

M Enter the buck ratio (bucks per 100 does) from the previous year fall herd composition count. This value will be used in combination with the spring fawn ratio to determine the pre-season (last season) buck ratio.

N Enter the year of the hunting season for which the calculations are being made.

Additional data are entered in the following columns:

AA Enter the year of the hunting season for which the calculations are being made.

AG Enter the desired post-season buck ratio (bucks per100 does). This value is usually the objective proportion of bucks listed in the goals section of the deer herd management plan.

AJ Enter the expected percent hunter success rate. This value is usually based upon previous year's data.

Computations: (See Table 1 for the actual mathematical formulas)

column

O The predicted spring fawn ratio is calculated by reducing the observed proportion of fawns in the fall by the percent expected over-winter loss.

P Natural doe mortality rate is calculated as approximately 8% of the magnitude of fawn over-winter loss. This value is based upon a Wisconsin study of white-tailed deer where 2,845 carcasses were examined during the winter periods of 1940 through 1952 (starvation was the single most important decimating factor identified for both adults and fawns).

Q Doe crippling and natural mortality rate is calculated as a function of natural doe mortality. The rate calculated in "P" is multiplied by 7.1 in accordance with a regression between measured fawn loss and doe loss from the same Wisconsin study mentioned above.

R The pre-season (before last season) buck ratio is calculated based upon the previous post-season buck ratio (buck carry0over) and the proportion of fawns which are recruited in the spring (half of the fawns in the spring will be classified as bucks the following fall).

S Reported and unreported buck harvest are calculated by inflating the number of bucks reported harvested.

T Total buck loss is calculated as the sum of reported harvest, unreported harvest, crippling loss and other buck losses.

U Doe loss is calculated according to a formula developed by the Nevada Department of Wildlife:

$$\frac{\frac{(\text{BuckKill-T})*(100)}{(\text{R-K})*(100)} + \text{K}}{\text{Q}} = \text{Calculated Doe Loss}$$

V Total doe loss is calculated by summing the calculated doe loss and doe harvest (inflated by the unreported harvest rate) and other doe losses.

W K (in the basic Selleck-Hart formulas listed on page 3) is calculated as the ratio of total buck loss to total doe loss.

X Buck harvest mortality rate is calculated according to formula 2 listed on page 3.

Y Preseason (last hunting season) buck population size is calculated as the ratio of total buck loss to the buck harvest mortality rate.

Z Doe mortality rate is calculated according to formula 1 listed on page 3.

AB Fall (prior to next hunting season) buck population size is calculated by reducing the preseason (last season) buck population size (Y) by the sum of total buck loss and estimated over-winter loss (regression formula based upon relative fawn over-winter loss).

AC Fall doe population size is calculated from the observed ratio of bucks to does in the herd and the fall buck population size (AB).

AD Fall fawn population size is calculated from the observed ratio of fawns to does in the herd and the doe population size (AC).

AE Total fall population size is the sum of the fall bucks, does and fawns.

AF Predicted preseason (before next hunting season) buck ratio is calculated by summing the fall buck population size half the fall fawns and dividing by the sum of the doe population size and half the fall fawns.

AG Desired buck ratio is an input variable and is usually the herd plan objective level.

AH The number of bucks needed to maintain the desired buck ratio is the product of the total number of does (fall doe population size plus half the fall fawns) and the desired buck ratio times 100.

AI The number of extra bucks which could be harvested is the difference between the total number of bucks (fall bucks plus half the fall fawns) and the number of bucks needed to maintain the desired buck ratio.

AJ and AK These data are input variables for expected percent hunter success and the desired post season buck ratio (bucks per 100 does).

AK This is an input variable or formula for the number of extra bucks to be harvested in California. In some instances, the total number of extra bucks is split equitably between states where deer herds migrate between states.

AL The number of deer hunting tags is calculated by dividing the number of bucks to harvest in California by the hunter success rate. This final value is proposed to the Fish and Game Commission as the number of permits for each zone.

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APPENDIX 5

Use of the KILLVARY Population Model

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Use Of The KILLVARY Population Model

ABSTRACT

The KILLVARY population simulation model is a mathematical spreadsheet which incorporates accepted biological principles about mule deer. The major assumption of the model is that the number of deer in the herd is regulated by the amount of good forage available to the deer. The model uses real data which are regularly gathered by the Department. KILLVARY will result in estimates of the number of deer in the herd, percent of the herd lost to hunting and non hunting causes and the effects upon the herd of a varying range carrying capacity. The use of KILLVARY is discussed in the text.

BACKGROUND

The California Department of Fish and Game has responsibility for managing deer in California. With this responsibility, the Department has two general goals for the deer management:

1. Restore and maintain healthy deer herds in the wild state.
2. Provide for high quality and diversified use of deer in the state.

These goals are met by maintaining or working toward attaining specific objectives stated in deer herd management plans. Each deer plan (there are 79 herd plans for California deer) identifies objective levels which usually include the number of deer in the herd, proportion of bucks in the deer herd (buck ratio), survival rate of fawns and percent hunter success.

In virtually all habitats of the state, deer numbers are regulated by the availability of good forage. Where forage, which consists mostly of brush, quality is improved by burning, planting, etc., or by improved precipitation, deer numbers respond favorably. Throughout most of the state, however, habitat quality for deer is slowly declining, mostly because the brush is too old to be of much forage value or it has grown so high that it is no longer available to deer. The declining forage base is demonstrated by the decline in buck harvest and deer numbers for most deer herd during the past couple decades. In many herds, deer numbers are less than half the numbers of the early to mid 1960's.

Management of deer habitat to produce more deer is not easy. Deer habitat management is a complex issue requiring coordinated efforts on the part of multiple State and Federal agencies along with private landowners and interested members of the public. Consequently, managing deer numbers and herd health (a goal of deer management) by habitat management is difficult and expensive.

The decline in deer numbers during the past couple decades does not, however, mean that deer should be protected from hunting. In fact, many more fawns are born each year than survive through the first year, indicating that herds have an unrealized potential to sustain greater levels of adult mortality than they currently experience.

The Department has its greatest opportunities for management of deer numbers through deer hunting. This is because the Department works closely with the Fish and Game Commission and makes annual recommendations to the Commission for changes in deer hunting regulations.

During the general rifle season, about five percent of the total population is harvested when bucks only are being hunted. The hunt generally removes about 40% of the adult bucks from the buck population. Because bucks comprise only 10 to 20% of the total population, the effect of the general season on the local deer population size is small. In fact, the number of deer removed during the hunting season will not affect the local post-season population size relative to previous years.

During the most liberal antlerless and either sex deer hunts currently conducted in the State, less than seven percent of the adult does are removed. Because does comprise only about 50% of each herd, the effect of the hunt on the local deer population is small. The proposed change may reduce the local post-season population size by three percent. Again, the number of deer removed by hunting season will not significantly affect the local post-season population size relative to previous years.

The reason that current deer hunting strategies do not affect the local population size over the longer term is because of the high productive potential of deer. During the annual cycle, fawns are added to the adult population in the late4 spring/early summer. Because about 1.5 fawns are produced from each doe (ca. Every other doe produces twins) the population size nearly doubles each late spring/early summer. Most of these fawns will die (usually 70 to 80%) during the first year of life and only enough will survive (20 to 30%) to replace adult deer which died during the previous year. If there is new additional habitat available or improved habitat conditions to support additional animals, a proportionate number of fawns will be sustained. Consequently, the annual removal of deer will be replaced by incoming fawns during the next late spring/early summer, and the local population size will not be affected over the annual cycle.

The KILLVARY model was developed by Dave Smith, a Department Wildlife Biologist in Redding, and was designed to allow easy simulation of various hunting strategies for all deer herds in the State. The Department has found that performing the model calculations by hand severely limits the number of harvest scenarios that can be investigated. The obvious advantages of the computer

increased. (Please be aware that any time the mortality factors are modified, the recruitment of fawns and fawn ratios will change. When this happens, the percent mortality due to non hunting causes may need to be adjusted until the buck and fawn ratios stabilize at the observed values for ten years.)

When the buck ratio and fawn ratio are maintained at the value observed in the field (initial buck and fawn ratios), and the number of bucks and does harvested in the model agree with the real values, then the model is lined up. At this point you have produced relatively accurate (ass accurate as input data) estimates of herd size and the mortality rates for adults due to both hunting and non hunting causes.

Running Management Scenarios -

Running management scenarios on a herd model which has been lined up on real data can be an exciting process and demonstrates the utility of the KILLVARY model. Management scenarios almost always involve changing either mortality factors or the carrying capacity of the range.

Of particular interest is manipulation of buck and doe harvest mortality rates to simulate antlerless hunts, restrictive buck hunting quotas, etc. Some enlightening results come from changes in hunting strategies. Please pay particular attention to the number of animals harvested and changes in ratios as the level of doe mortality changes.

One important factor, maximum spring fawn ratio, requires some discussion here. The various scenarios which increase the level of adult mortality will stimulate additional fawn survival only to the level specified as the maximum spring fawn ratio. In other words, there is a limit to the flexibility and adaptability of the herd in question. For example, doe harvest is appropriate only to the point that the population isn't drawn below acceptable levels. Population size compared to K needs to be monitored when assessing management scenarios. Undetermined pressures on the quality or availability of deer habitat which reduce K is the probable cause of the declines in deer numbers. Once a declining or varying K is put in place in the model, other scenarios (eg. harvest) can be simulated.

APPENDIX 6

Maps of Project Areas

APPENDIX 6. 2004 DEER ZONE AND HUNT MAP CROSS REFERENCE.

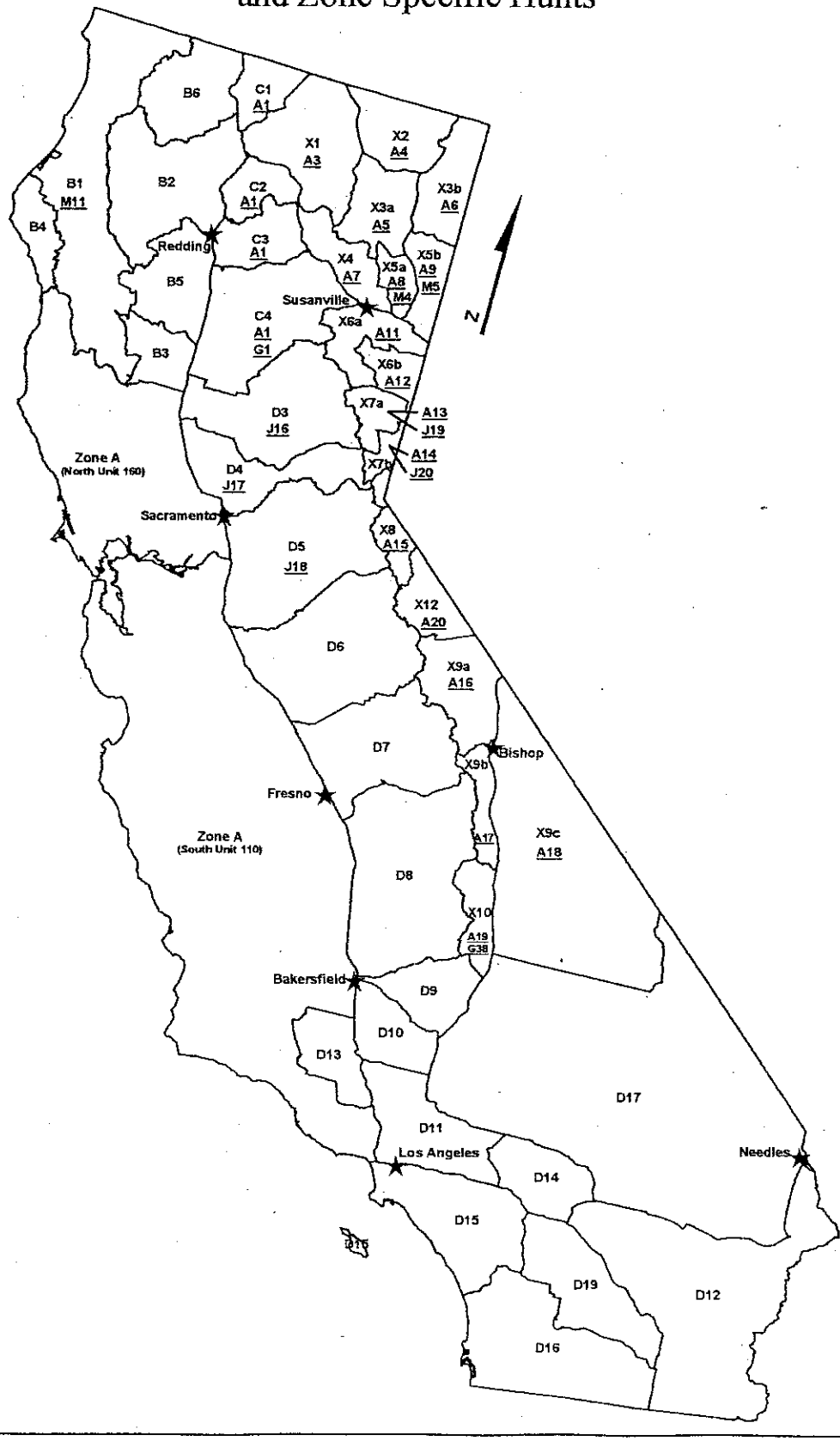
HUNT ZONE	MAP CROSS-REFERENCE
A	SEE CALIFORNIA ZONE MAP
B-1	SEE CALIFORNIA ZONE MAP
B-2	SEE CALIFORNIA ZONE MAP
B-3	SEE CALIFORNIA ZONE MAP
B-4	SEE CALIFORNIA ZONE MAP
B-5	SEE CALIFORNIA ZONE MAP
B-6	SEE CALIFORNIA ZONE MAP
C-1	SEE CALIFORNIA ZONE MAP
C-2	SEE CALIFORNIA ZONE MAP
C-3	SEE CALIFORNIA ZONE MAP
C-4	SEE CALIFORNIA ZONE MAP
D-3	SEE CALIFORNIA ZONE MAP
D-4	SEE CALIFORNIA ZONE MAP
D-5	SEE CALIFORNIA ZONE MAP
D-6	SEE CALIFORNIA ZONE MAP
D-7	SEE CALIFORNIA ZONE MAP
D-8	SEE CALIFORNIA ZONE MAP
D-9	SEE CALIFORNIA ZONE MAP
D-10	SEE CALIFORNIA ZONE MAP
D11	SEE CALIFORNIA ZONE MAP
D-12	SEE CALIFORNIA ZONE MAP
D-13	SEE CALIFORNIA ZONE MAP
D-14	SEE CALIFORNIA ZONE MAP
D-15	SEE CALIFORNIA ZONE MAP
D-16	SEE CALIFORNIA ZONE MAP
D-17	SEE CALIFORNIA ZONE MAP
D-19	SEE CALIFORNIA ZONE MAP
X-1	SEE CALIFORNIA ZONE MAP
X-2	SEE CALIFORNIA ZONE MAP
X-3a	SEE CALIFORNIA ZONE MAP
X-3b	SEE CALIFORNIA ZONE MAP
X-4	SEE CALIFORNIA ZONE MAP
X-5a	SEE CALIFORNIA ZONE MAP
X-5b	SEE CALIFORNIA ZONE MAP
X-6a	SEE CALIFORNIA ZONE MAP
X-6b	SEE CALIFORNIA ZONE MAP
X-7a	SEE CALIFORNIA ZONE MAP
X-7b	SEE CALIFORNIA ZONE MAP
X-8	SEE CALIFORNIA ZONE MAP
X-9a	SEE CALIFORNIA ZONE MAP
X-9b	SEE CALIFORNIA ZONE MAP
X-9c	SEE CALIFORNIA ZONE MAP
X-10	SEE CALIFORNIA ZONE MAP
X-12	SEE CALIFORNIA ZONE MAP

HUNT NUMBER	MAP CROSS-REFERENCE
A-1	SEE CALIFORNIA ZONE MAP (ZONES C1-C4)
A-3	SEE CALIFORNIA ZONE MAP (ZONE X-1)
A-4	SEE CALIFORNIA ZONE MAP (ZONE X-2)
A-5	SEE CALIFORNIA ZONE MAP (ZONE X-3a)
A-6	SEE CALIFORNIA ZONE MAP (ZONE X-3b)
A-7	SEE CALIFORNIA ZONE MAP (ZONE X-4)
A-8	SEE CALIFORNIA ZONE MAP (ZONE X-5a)
A-9	SEE CALIFORNIA ZONE MAP (ZONE X-5b)
A-11	SEE CALIFORNIA ZONE MAP (ZONE X-6a)
A-12	SEE CALIFORNIA ZONE MAP (ZONE X-6b)
A-13	SEE CALIFORNIA ZONE MAP (ZONE X-7A)
A-14	SEE CALIFORNIA ZONE MAP (ZONE X-7b)
A-15	SEE CALIFORNIA ZONE MAP (ZONE X-8)
A-16	SEE CALIFORNIA ZONE MAP (ZONE X-9a)
A-17	SEE CALIFORNIA ZONE MAP (ZONE X-9b)
A-18	SEE CALIFORNIA ZONE MAP (ZONE X-9c)
A-19	SEE CALIFORNIA ZONE MAP (ZONE X-10)
A-20	SEE CALIFORNIA ZONE MAP (ZONE X-12)
A-21	SEE AREA SPECIFIC MAP (A-21)
A-22	SEE AREA SPECIFIC MAP (A-22)
A-24	SEE AREA SPECIFIC MAP (A-24)
A-25	SEE AREA SPECIFIC MAP (A-25)
A-26	SEE AREA SPECIFIC MAP (A-26)
A-27	SEE AREA SPECIFIC MAP (A-27)
A-30	SEE AREA SPECIFIC MAP (A-30)
A-31	SEE AREA SPECIFIC MAP (A-31)
A-32	SEE AREA SPECIFIC MAP (A-32)
G-1	SEE CALIFORNIA ZONE MAP (ZONE C-4)
G-3	SEE AREA SPECIFIC MAP (G-3)
G-6	SEE AREA SPECIFIC MAP (G-6)
G-7	SEE AREA SPECIFIC MAP (G-7)
G-8	SEE AREA SPECIFIC MAP (G-8)
G-9	SEE AREA SPECIFIC MAP (G-9)
G-10	SEE AREA SPECIFIC MAP (G-10)
G-11	SEE AREA SPECIFIC MAP (G-11)
G-12	SEE AREA SPECIFIC MAP (G-12)
G-13	SEE AREA SPECIFIC MAP (G-13)
G-19	SEE AREA SPECIFIC MAP (G-19)
G-21	SEE AREA SPECIFIC MAP (G-21)
G-37	SEE AREA SPECIFIC MAP (G-37)
G-38	SEE CALIFORNIA ZONE MAP (ZONE X-10)
G-39	SEE AREA SPECIFIC MAP (G-39)

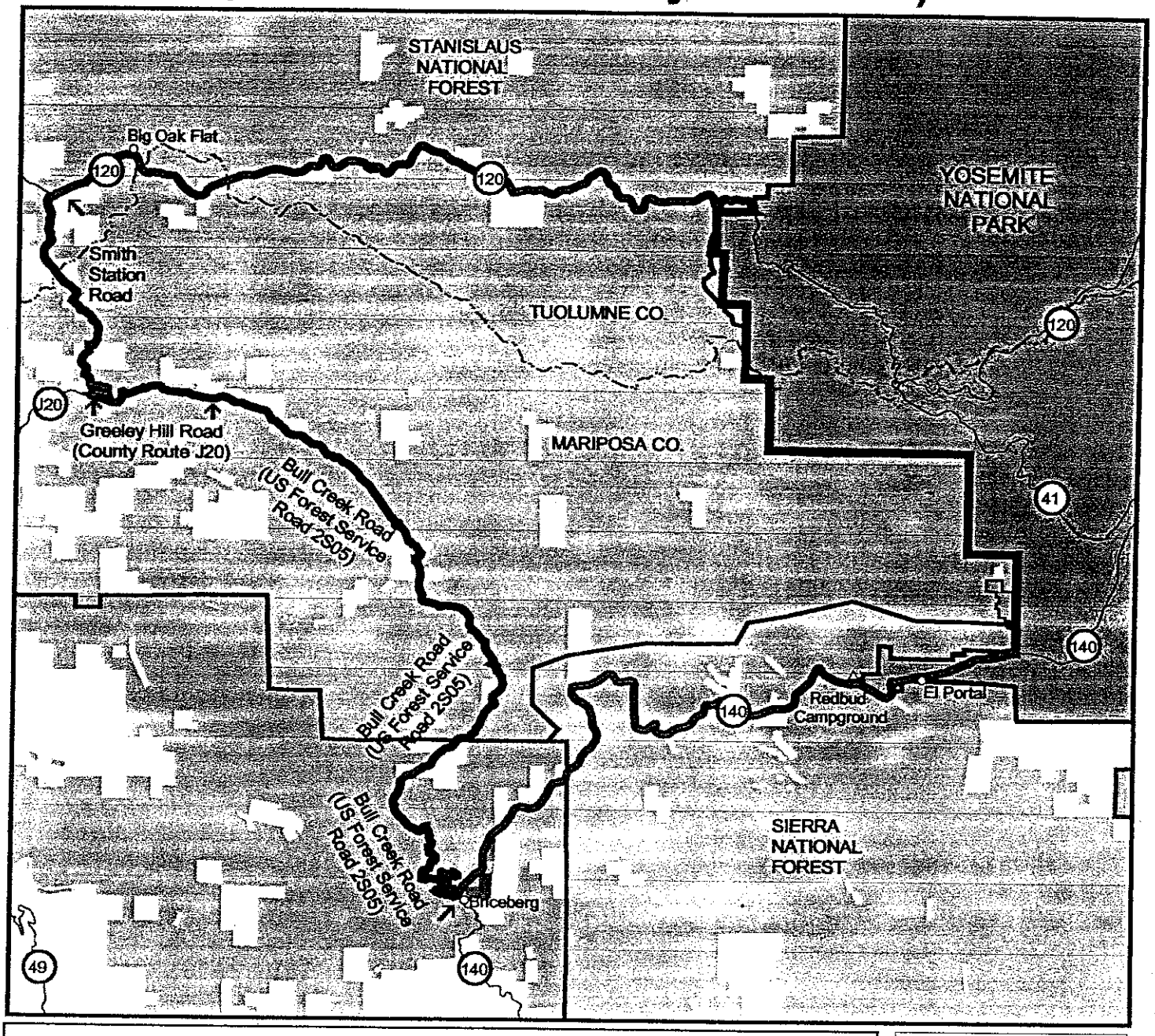
HUNT NUMBER	MAP CROSS-REFERENCE
J-1	SEE AREA SPECIFIC MAP (J-1)
J-3	SEE AREA SPECIFIC MAP (J-3)
J-4	SEE AREA SPECIFIC MAP (J-4)
J-7	SEE AREA SPECIFIC MAP (J-7)
J-8	SEE AREA SPECIFIC MAP (J-8)
J-9	SEE AREA SPECIFIC MAP (J-9)
J-10	SEE AREA SPECIFIC MAP (J-10)
J-11	SEE AREA SPECIFIC MAP (J-11)
J-12	SEE AREA SPECIFIC MAP (J-12)
J-13	SEE AREA SPECIFIC MAP (J-13)
J-14	SEE AREA SPECIFIC MAP (J-14)
J-15	SEE AREA SPECIFIC MAP (J-15)
J-16	SEE AREA SPECIFIC MAP (J-16)
J-17	SEE AREA SPECIFIC MAP (J-17)
J-18	SEE AREA SPECIFIC MAP (J-18)
J-19	SEE CALIFORNIA ZONE MAP (ZONE X-7a)
J-20	SEE CALIFORNIA ZONE MAP (ZONE X-7b)
J-21	SEE AREA SPECIFIC MAP (J-21)
M-3	SEE AREA SPECIFIC MAP (M-3)
M-4	SEE CALIFORNIA ZONE MAP (ZONE X-5a)
M-5	SEE CALIFORNIA ZONE MAP (ZONE X-5b)
M-6	SEE AREA SPECIFIC MAP (M-6)
M-7	SEE AREA SPECIFIC MAP (M-7)
M-8	SEE AREA SPECIFIC MAP (M-8)
M-9	SEE AREA SPECIFIC MAP (M-9)
M-11	SEE CALIFORNIA ZONE MAP (ZONE B-1)
MA-1	SEE AREA SPECIFIC MAP (MA-1)
MA-3	SEE AREA SPECIFIC MAP (MA-3)

California Department of Fish and Game

California Deer Hunt Zones and Zone Specific Hunts



Hunt Number A-21
(Anderson Flat Archery Buck Hunt)



US Forest Service
Bureau of Land Management
National Parks
Private**
Other Gov't Agency
Lake

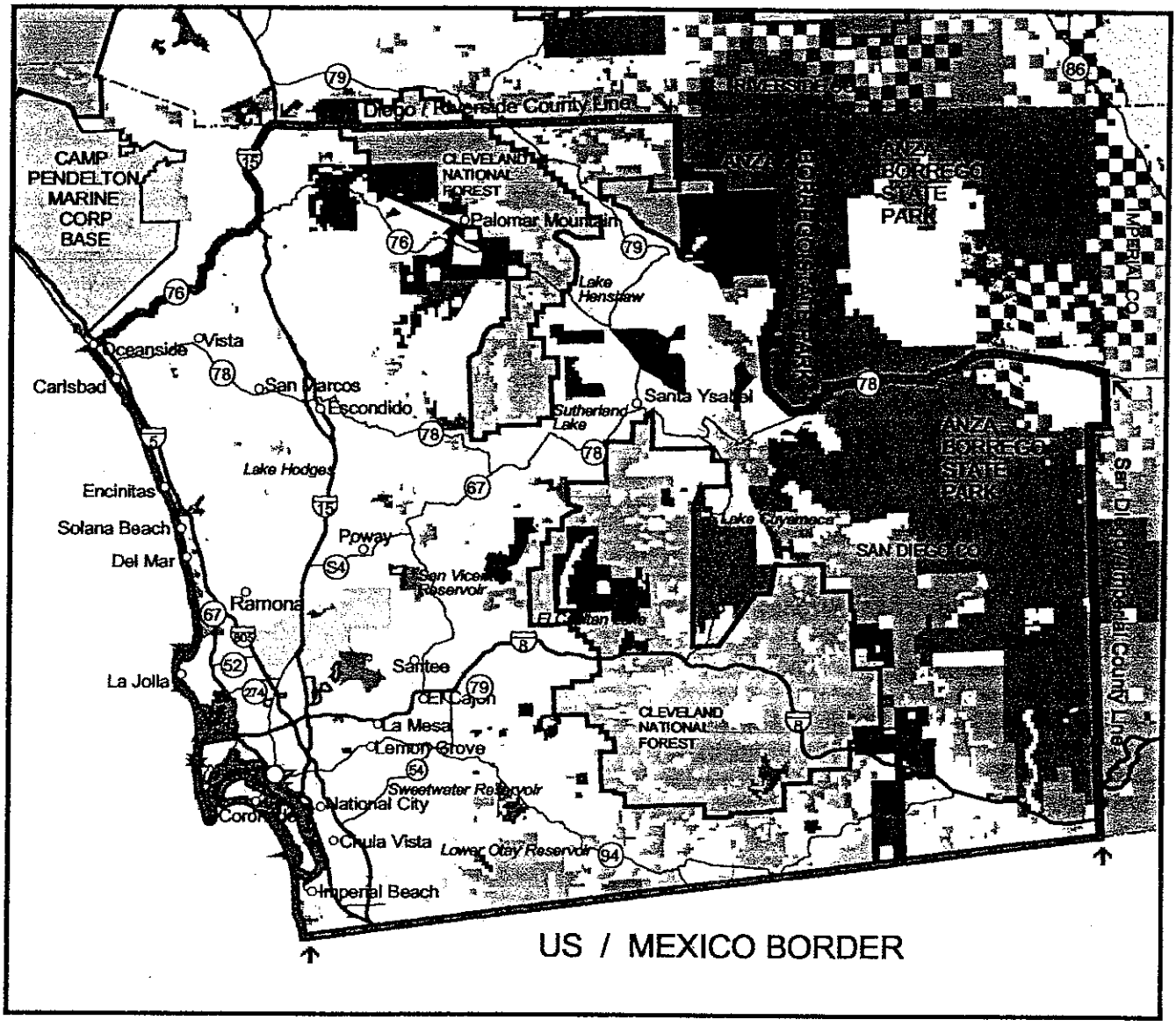
County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

** Private lands may be open or closed to deer hunting -- inquire locally.

This map should serve only as a guide to the general locations of deer hunting zones. Detailed legal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations."

Dept. of Fish and Game, Oct. 1999

Hunt Number A-22
(San Diego Archery Either-Sex Deer Hunt)



US Forest Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game
Refuges*
Military
Private**
Other Gov't Agency
Lake

3 0 3 6 9 Miles

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

* State protected reserves closed to deer hunting.
** Private lands may be open or closed to deer hunting – inquire locally.

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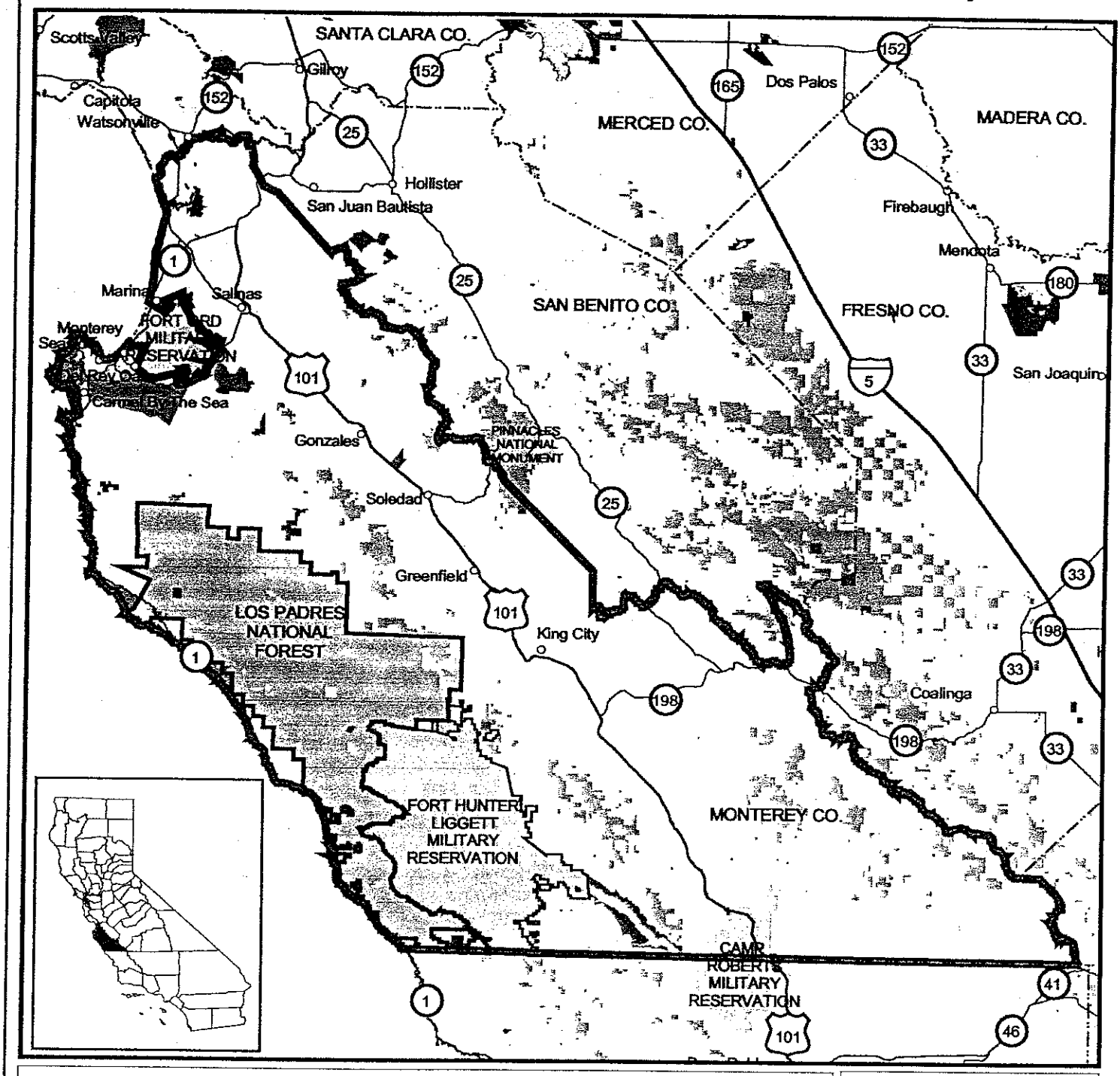
Department of Fish and Game
Oct., 1999

Hunt Number A-24
(Monterey Archery Either-Sex Deer Hunt)



US Forest Service
Bureau of Land Management
CA Dept. of Fish and Game
National Parks
Military

Other Gov't Agency
Lake
Private**

0 5 10 15 Miles

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

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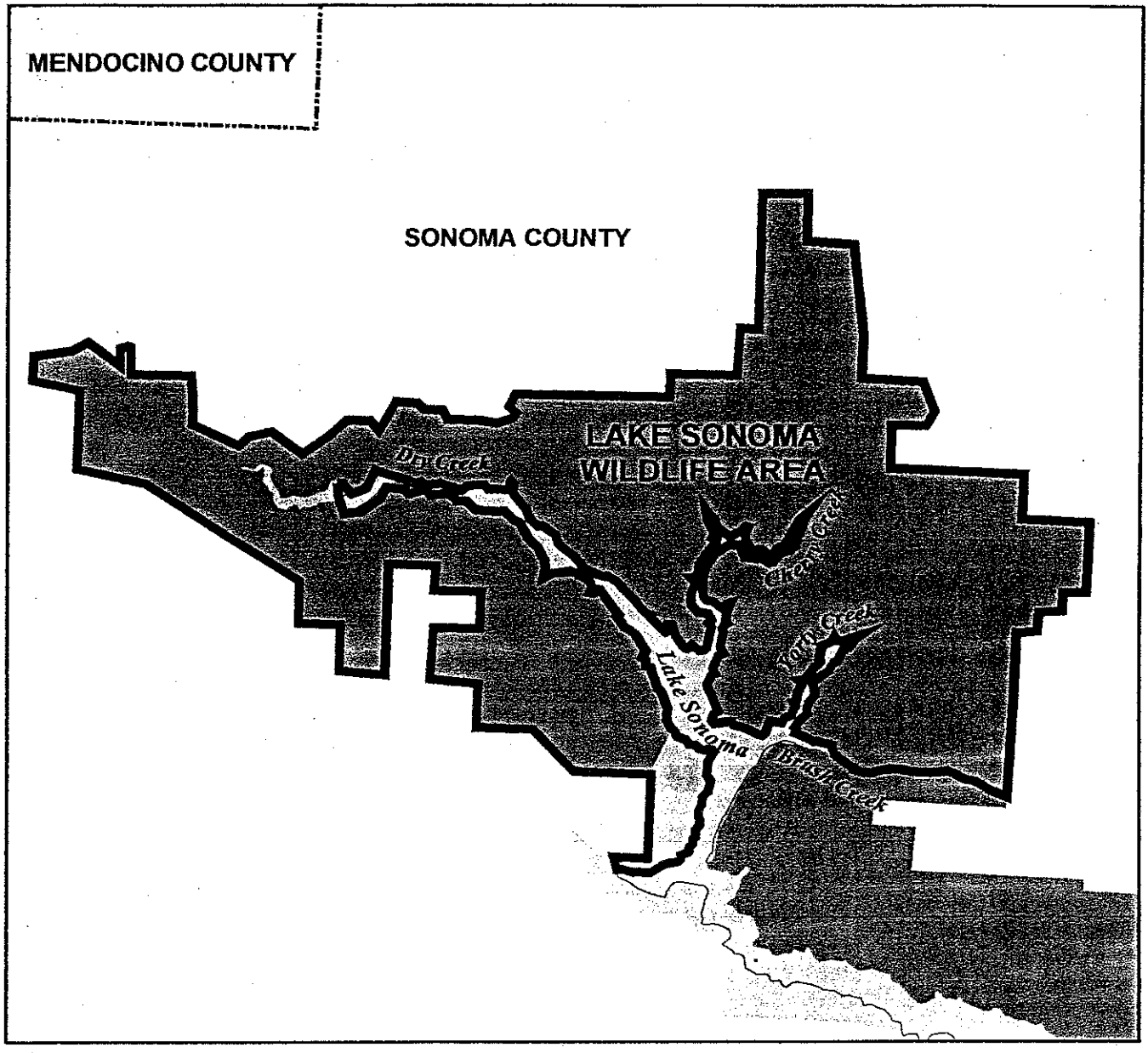
Dept. of Fish and Game, Oct. 1999

Hunt Number A-25
(Lake Sonoma Archery Either-Sex Deer Hunt)



Deer Hunt Zone

CA Dept. of Fish and Game

Lake

Military

County Line

Private **

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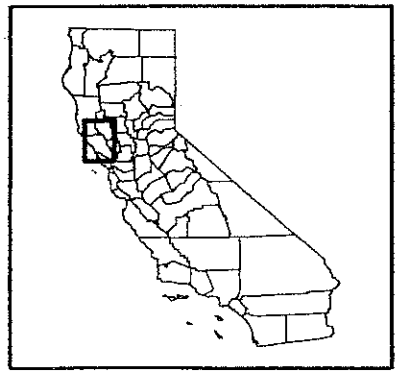
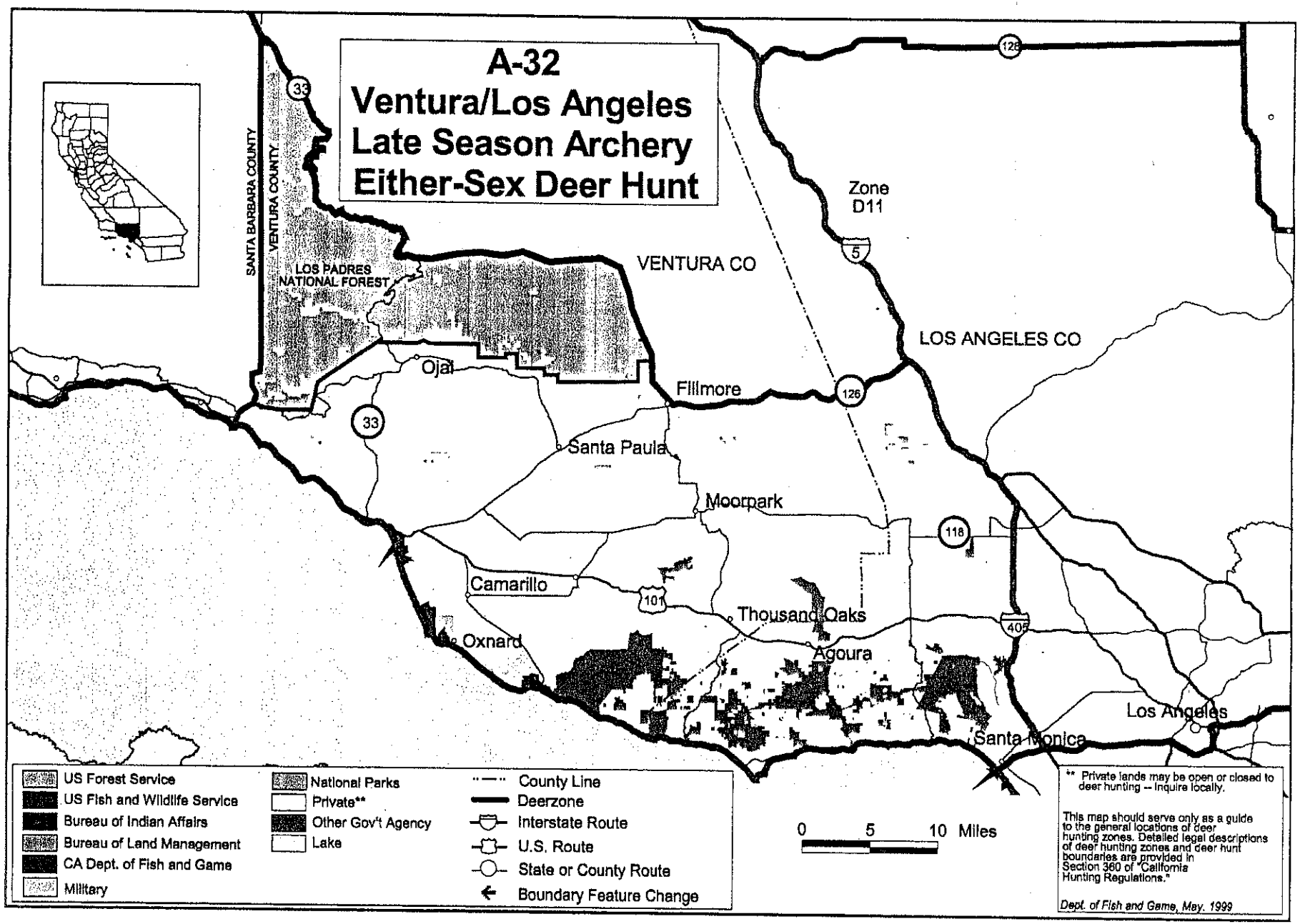
This map should serve only as a guide to the general locations of deer hunting zones. Detailed leagal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations"

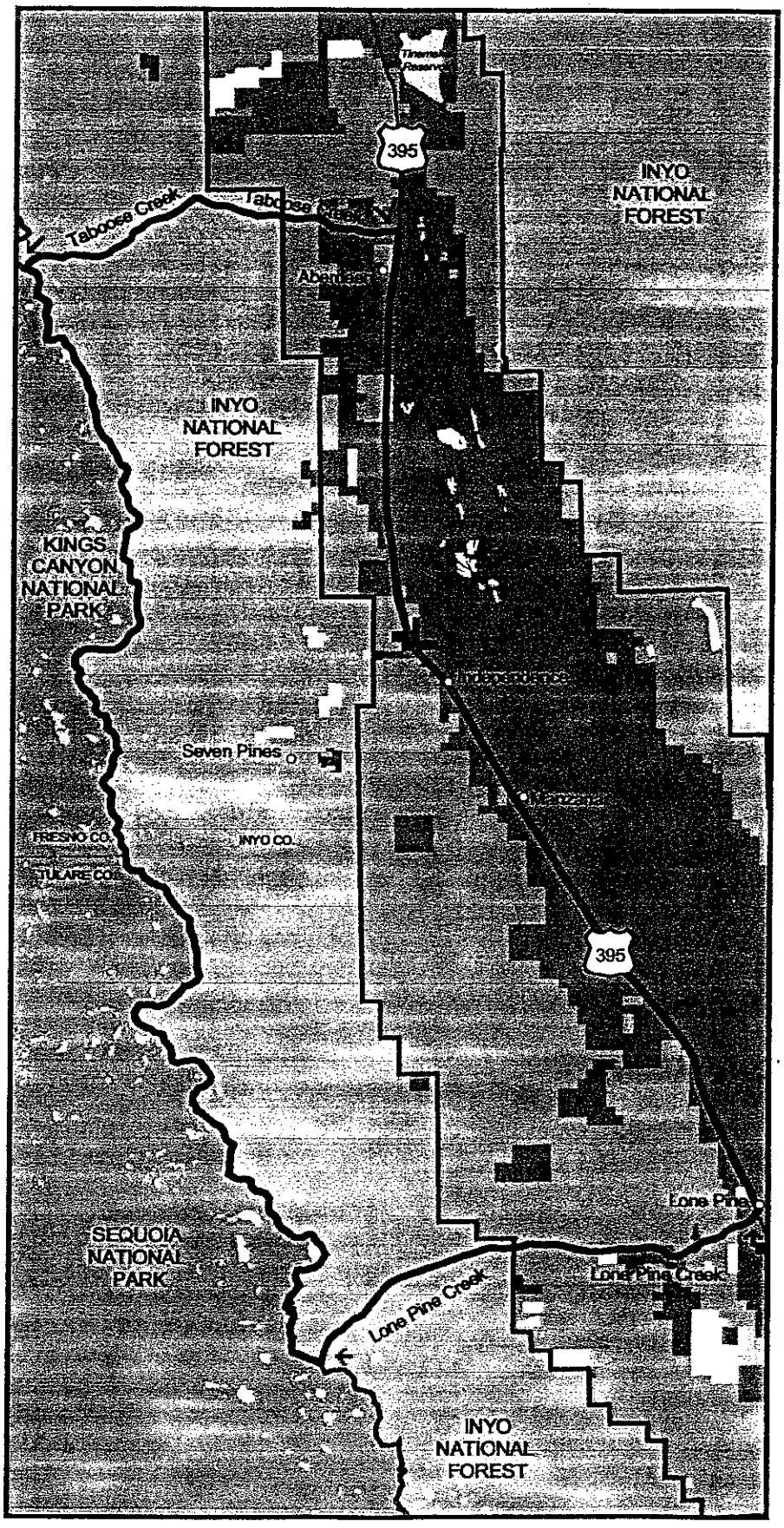
0 1 2 Miles



Department of Fish and Game
January 2004


A-32
Ventura/Los Angeles
Late Season Archery
Either-Sex Deer Hunt
SANTA BARBARA COUNTY
VENTURA COUNTY
LOS PADRES NATIONAL FOREST
VENTURA CO
LOS ANGELES CO
Zone D11
Ojai
Fillmore
Santa Paula
Moorpark
Camarillo
Thousand Oaks
Oxnard
Agoura
Los Angeles
Santa Monica
33
126
5
101
118
405
US Forest Service
US Fish and Wildlife Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game
Military
National Parks
Private**
Other Gov't Agency
Lake
County Line
Deerzone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change
0 5 10 Miles
** Private lands may be open or closed to deer hunting -- Inquire locally.
This map should serve only as a guide to the general locations of deer hunting zones. Detailed legal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations."
Dept. of Fish and Game, May, 1999

Hunt Number G-3
(Goodale Buck Hunt)



US Forest Service

Bureau of Indian Affairs

Bureau of Land Management

CA Dept. of Fish and Game

National Parks

Private**

Other Gov't Agency

Lake

County Line

Deer Hunt Zone

Interstate Route

U.S. Route

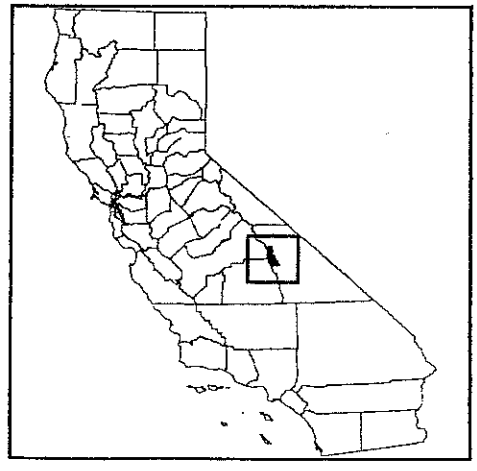
State or County Route

Boundary Feature Change

2 0 2 4 Miles

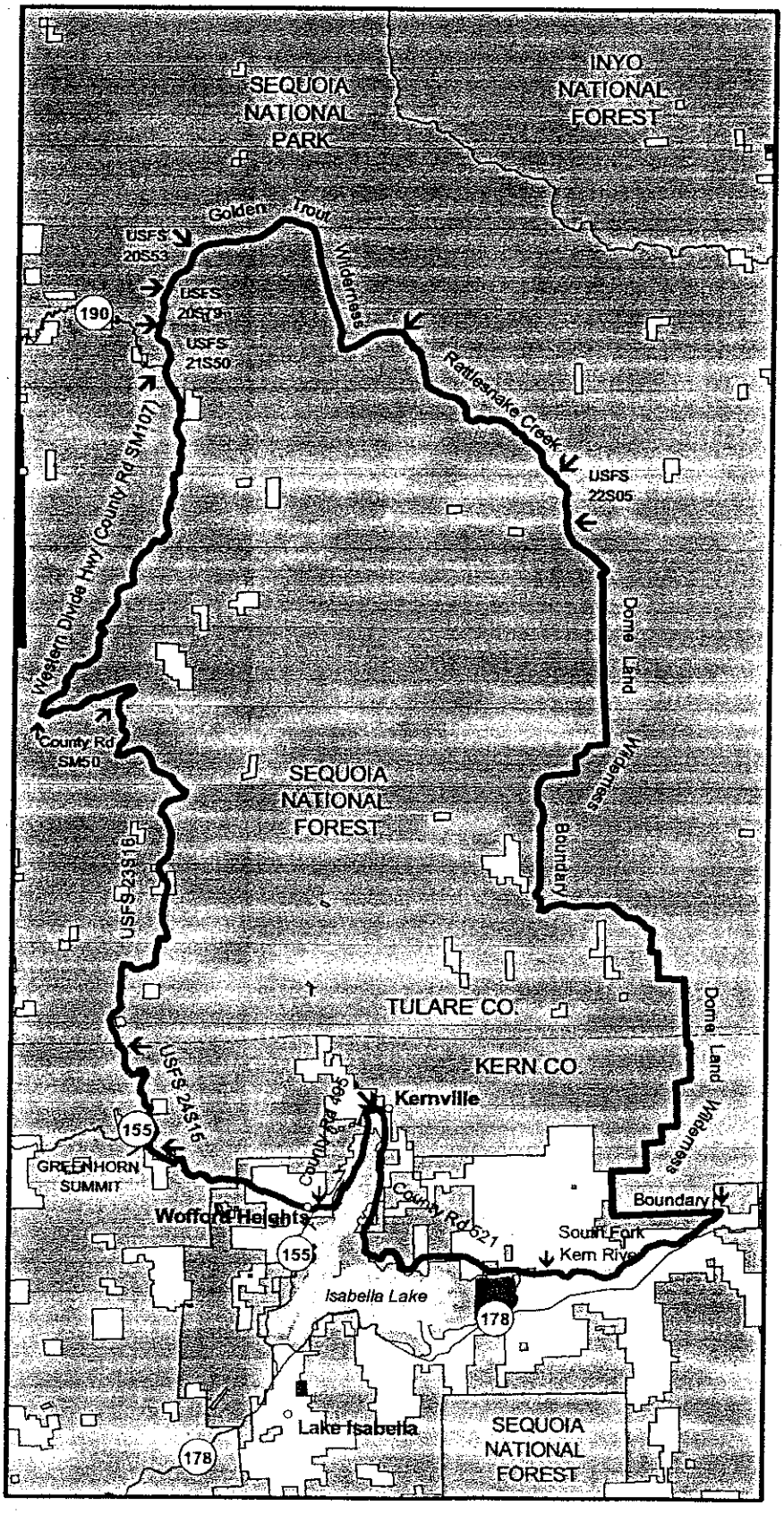
** Private lands may be open or closed to deer hunting – inquire locally.

This map should serve only as a guide to the general locations of deer hunting zones. Detailed legal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations."



Department of Fish and Game
Oct., 1999

Hunt Number G-6
(Kern River Deer Herd Buck Hunt)



US Forest Service
Bureau of Land Management
CA Dept. of Fish and Game
Military
Private**
Other Gov't Agency
Lake

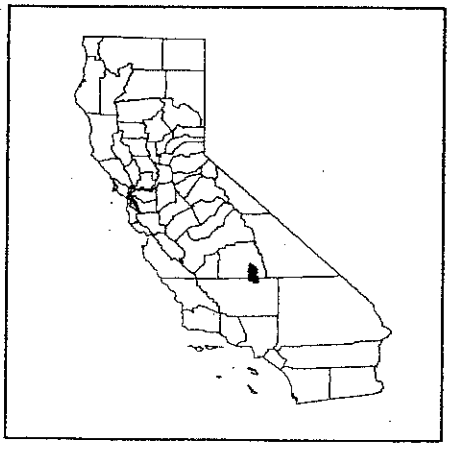
County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

2 0 2 4 Miles

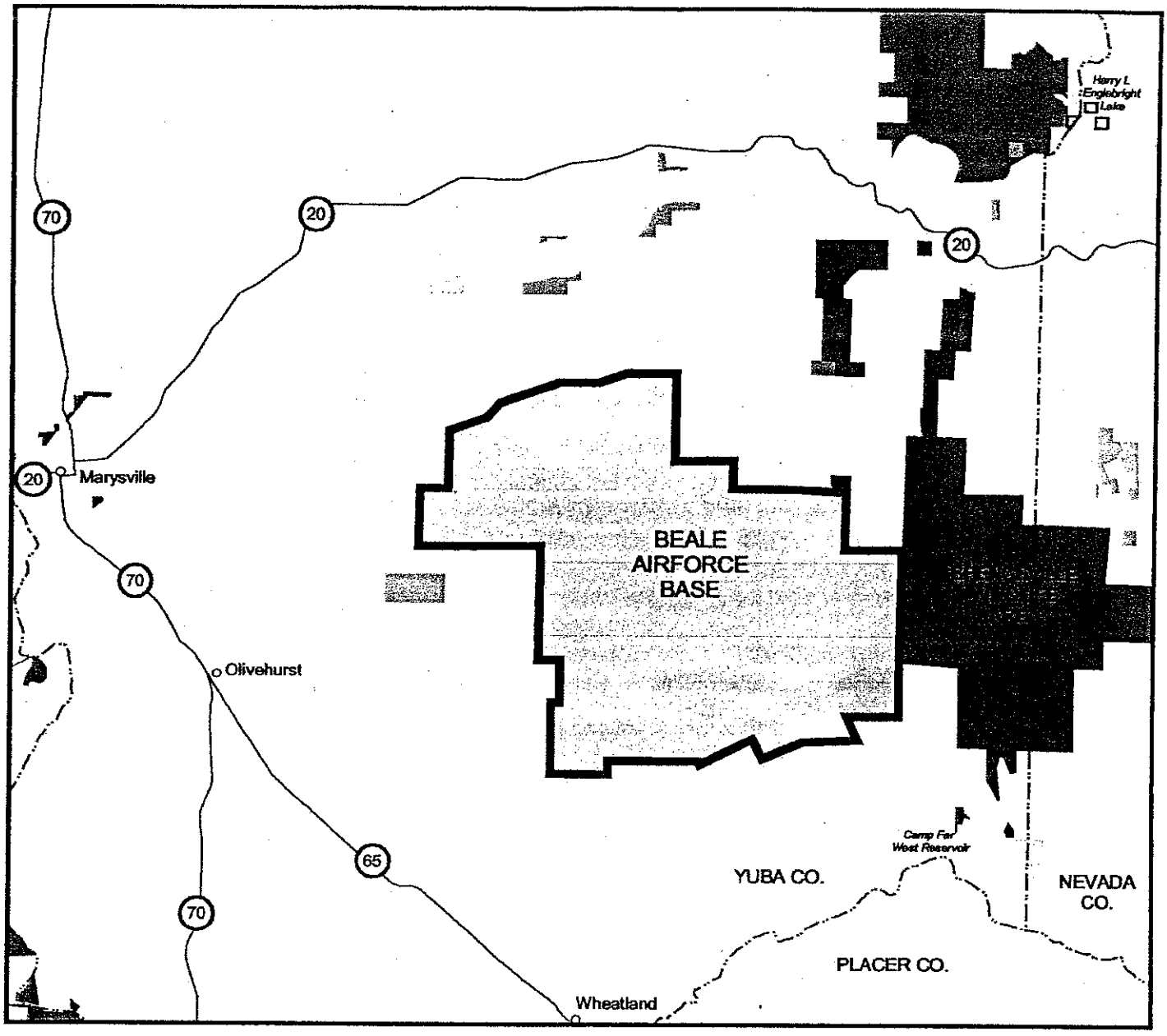
* Stateprotected reserves closed to deer hunting.
** Private lands may be open or closed to deer hunting -- inquire locally.

This map should serve only as a guide to the general locations of deer hunting zones. Detailed legaldescriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations".

Department of Fish and Game
March 2003



Hunt Number G-7
(Beale Either-Sex Deer Hunt)



Bureau of Land Management
CA Dept. of Fish and Game
Military
Private**
Other Gov't Agency
Lake
Interstate Route
U.S. Route
State or County Route

County Line
Deer Hunt Zone
Boundary Feature Change

2 0 2 4 Miles

** Private lands may be open or closed to deer hunting – inquire locally.

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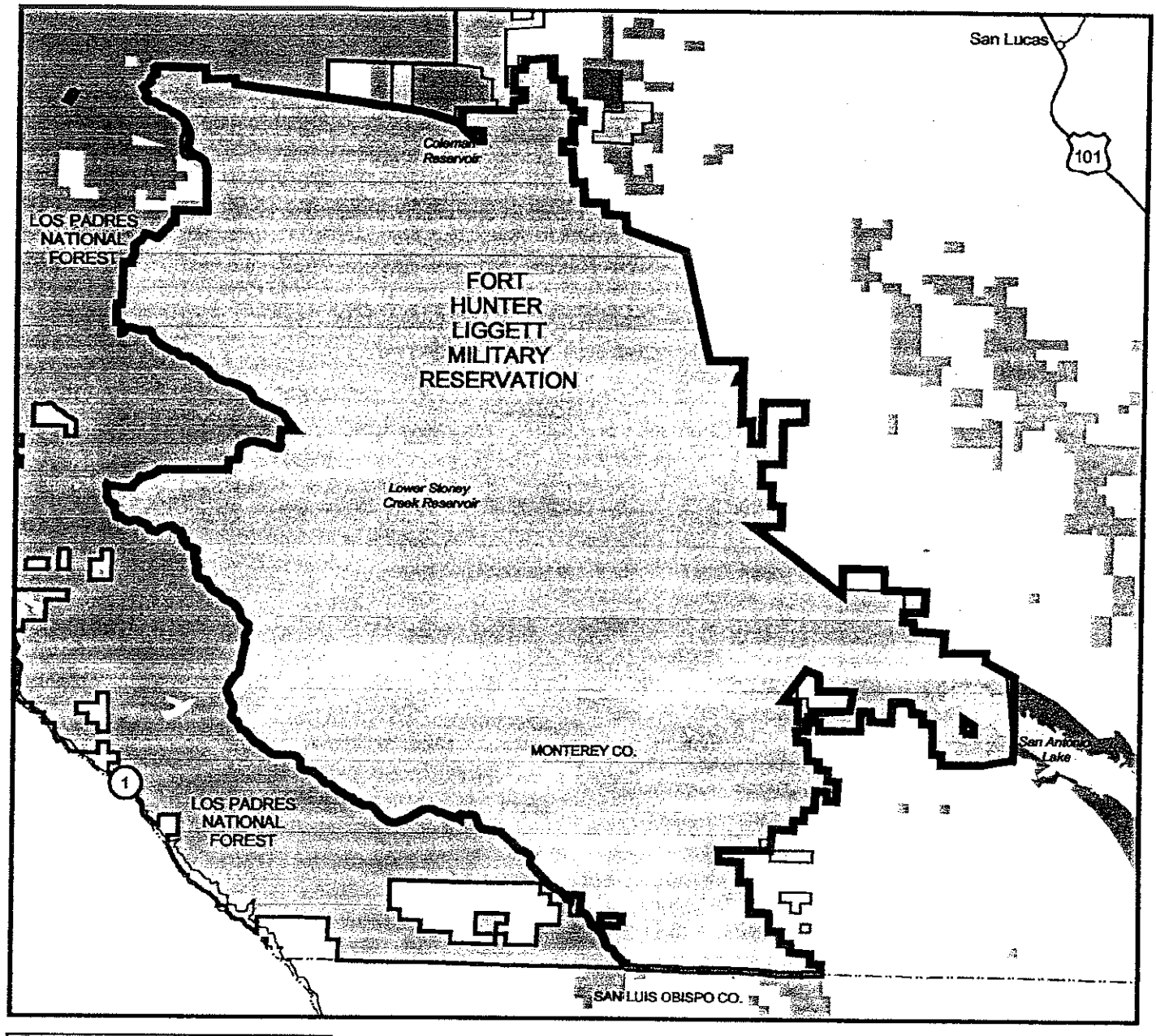
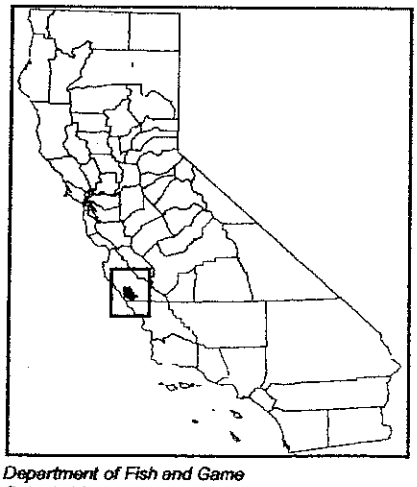
Department of Fish and Game
Oct., 1999

Hunt Number G-8
(Fort Hunter Liggett Antlerless Deer Hunt)





US Forest Service
Bureau of Land Management
Military
Private**
Other Gov't Agency
Lake
County Line
Deer Hunt Zone
Boundary Feature Change

Interstate Route
U.S. Route
State or County Route

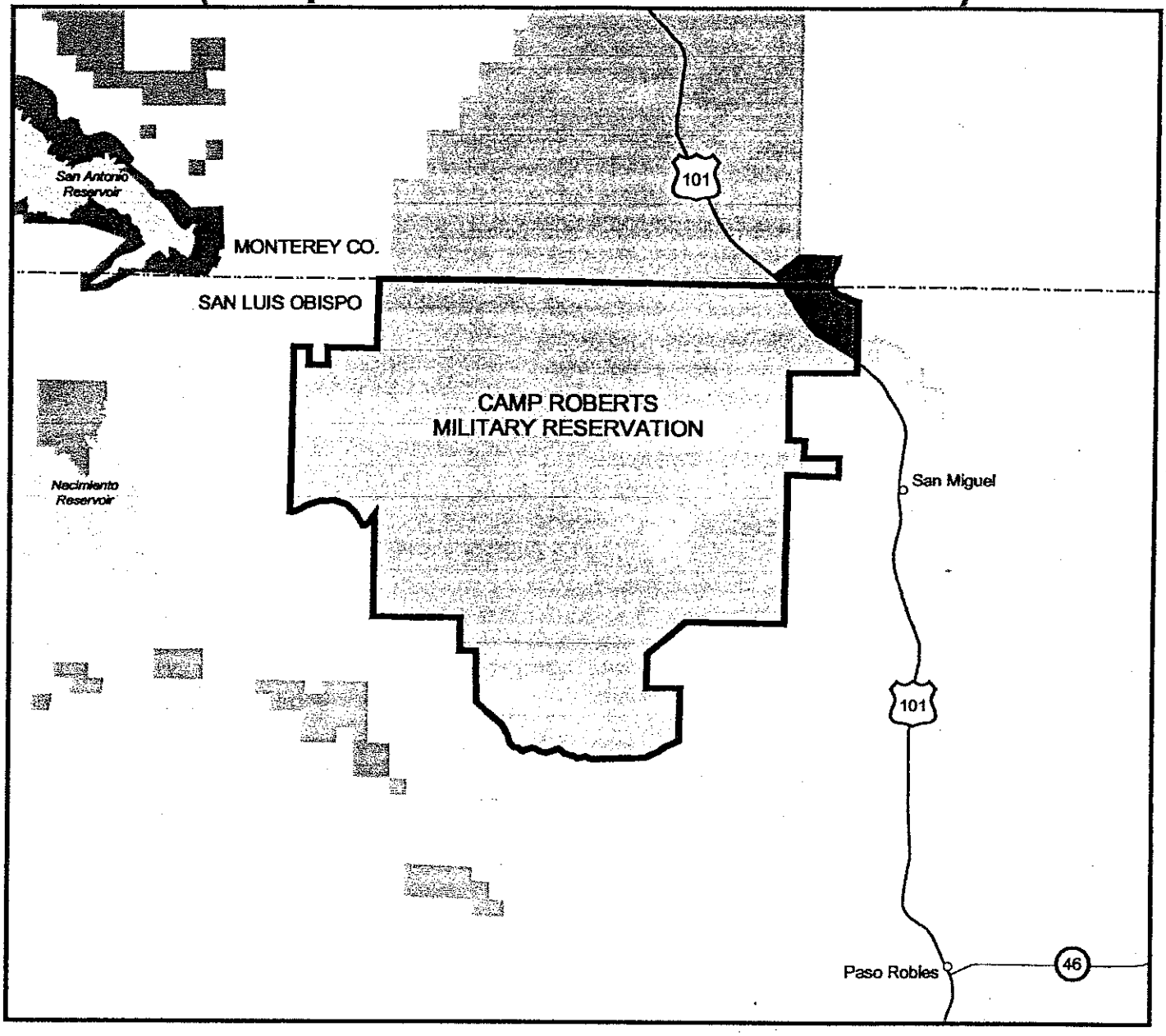
1 0 1 2 3 Miles

** Private lands may be open or closed to deer hunting -- inquire locally.

This map should serve only as a guide to the general locations of deer hunting zones. Detailed legal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations."

Department of Fish and Game
Oct., 1999

Hunt Number G-9
(Camp Roberts Antlerless Deer Hunt)



Bureau of Land Management
CA Dept. of Fish and Game
Military
Private**
Other Gov't Agency
Lake
Interstate Route
U.S. Route
State or County Route

County Line
Deer Hunt Zone
Boundary Feature Change

2 0 2 Miles

** Private lands may be open or closed to deer hunting – inquire locally.

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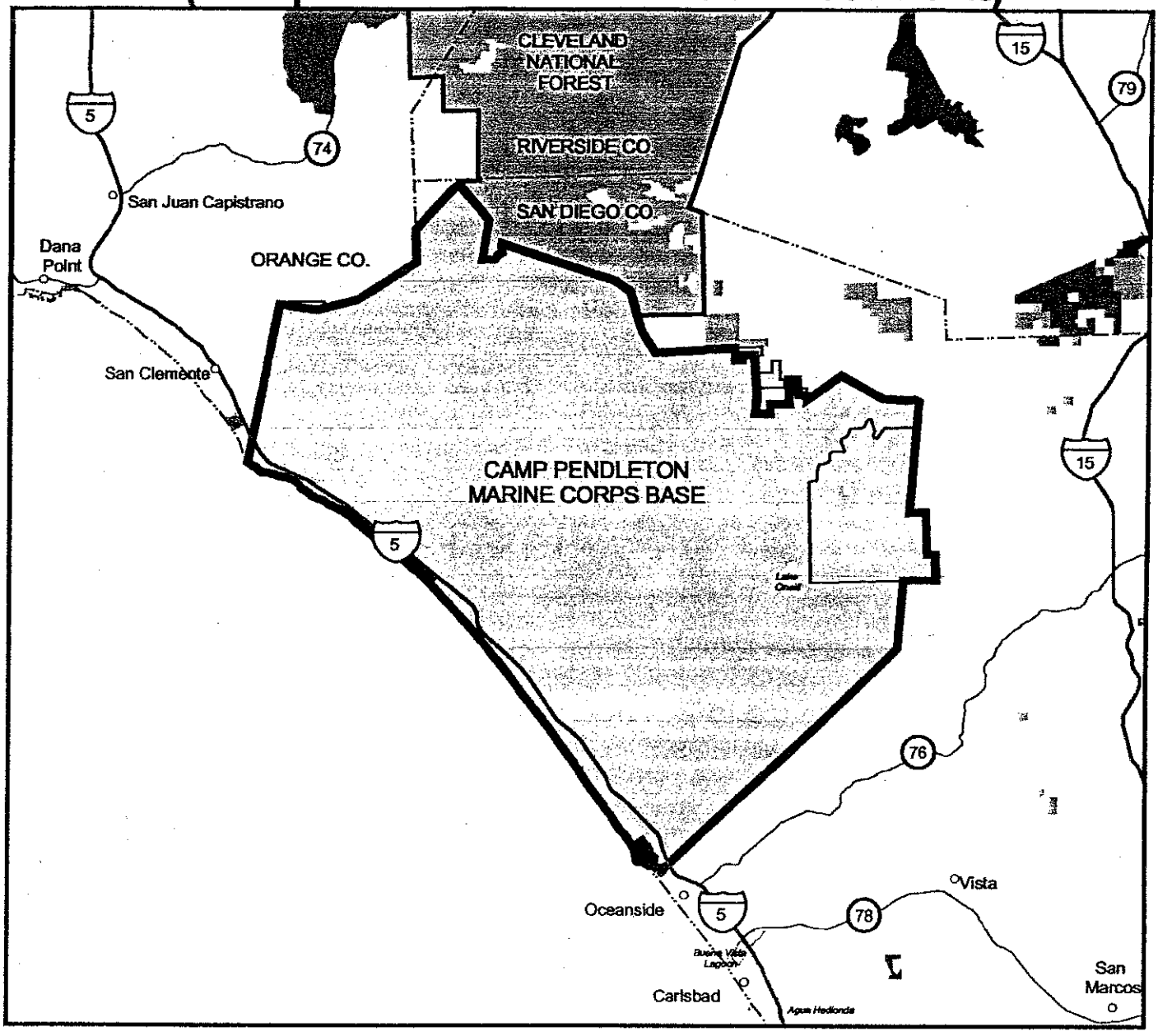
Department of Fish and Game
Oct., 1999

Hunt Number G-10
(Camp Pendleton Either-Sex Deer Hunt)



- US Forest Service
- US Fish and Wildlife Service
- Bureau of Indian Affairs
- Bureau of Land Management
- CA Dept. of Fish and Game
- Military
- National Parks
- Refuges*
- Private**
- Other Gov't Agency
- Lake
- County Line
- Deer Hunt Zone

- Interstate Route
- U.S. Route
- State or County Route
- Boundary Feature Change

3 0 3 6 Miles

* Stateprotected reserves closed to deer hunting.
** Private lands may be open or closed to deer hunting – inquire locally.

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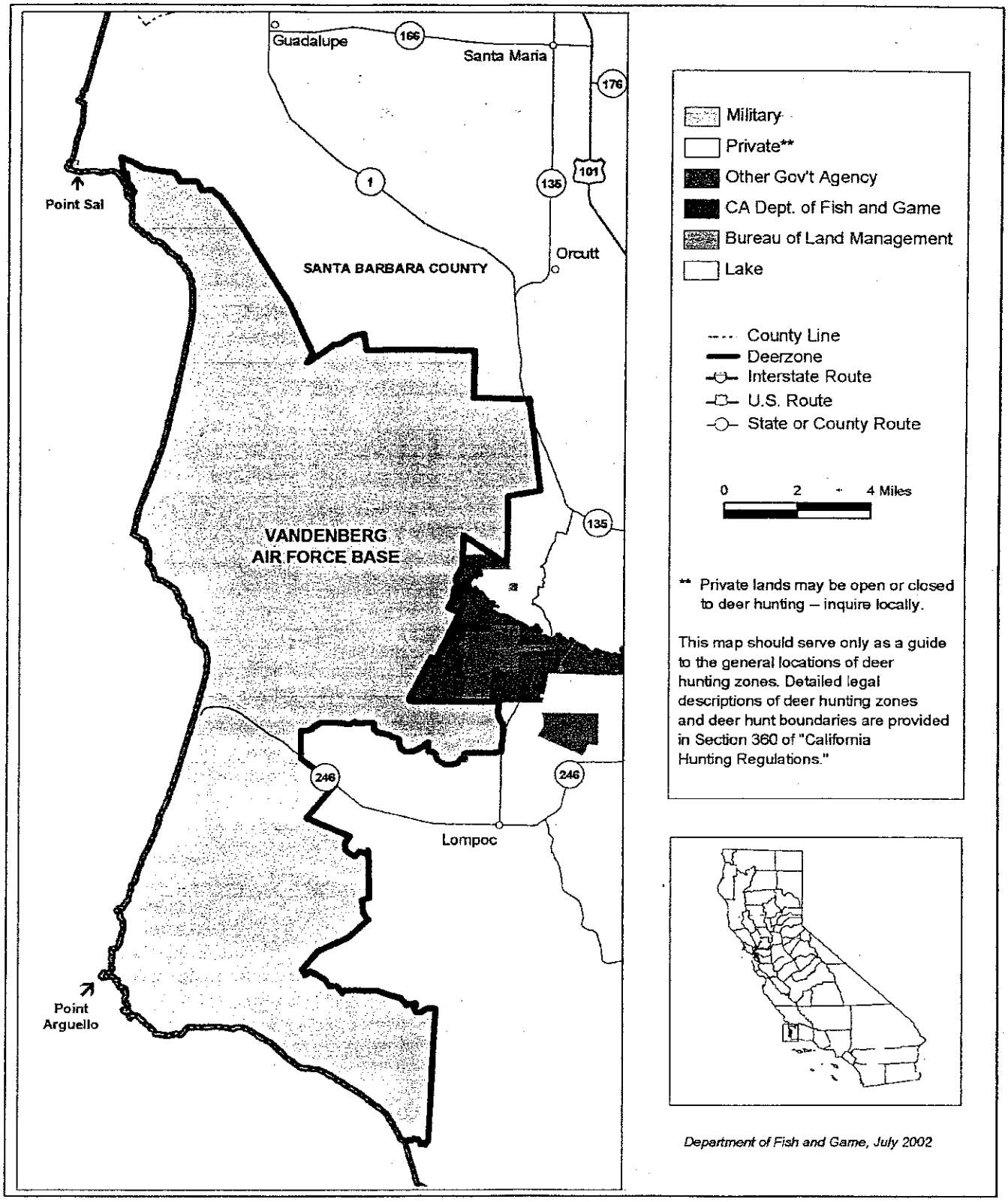
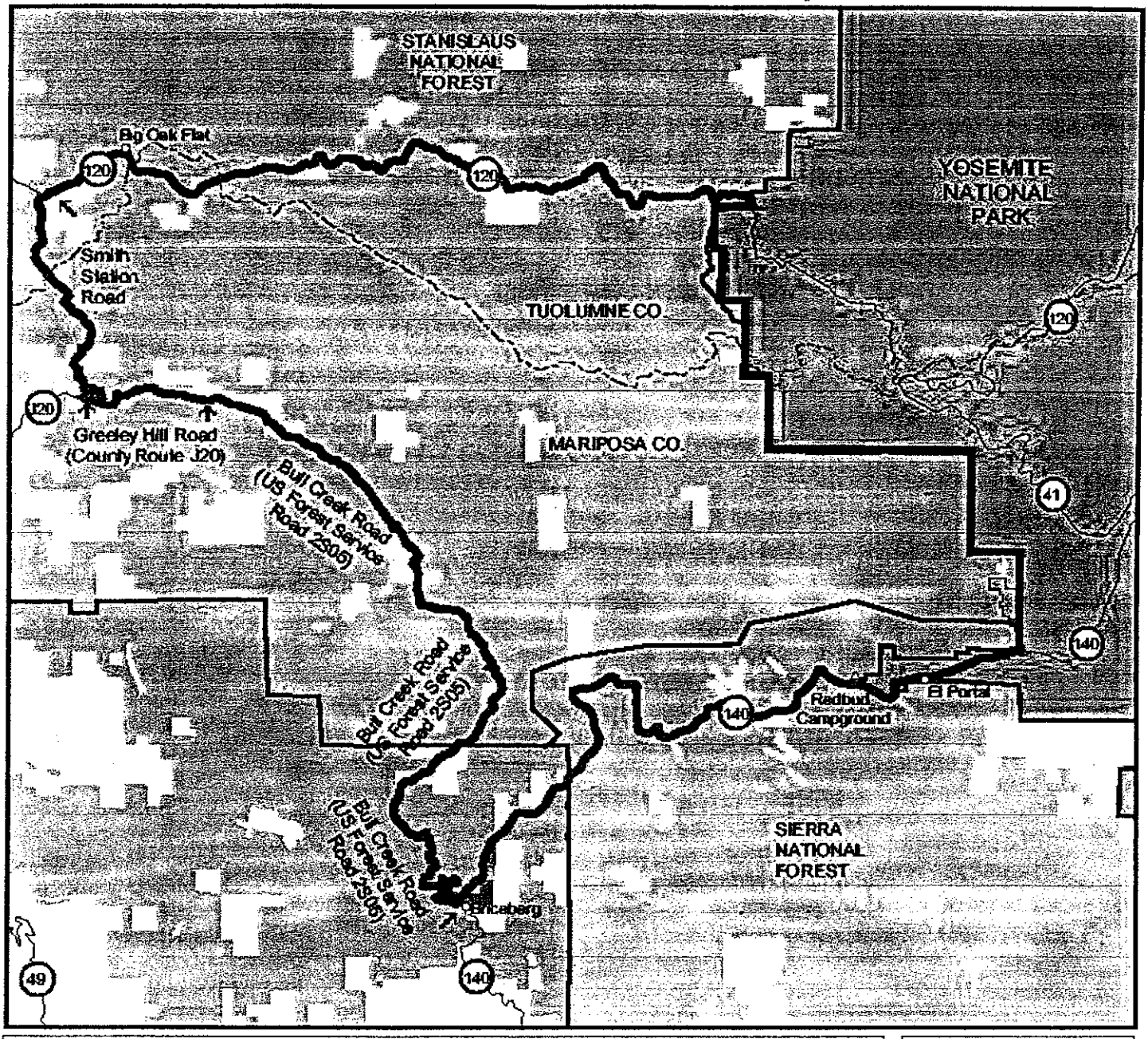
Department of Fish and Game
Oct., 1999

G-11 (Vandenberg Either-Sex Deer Hunt)



Department of Fish and Game, July 2002

Hunt Number G-37
(Anderson Flat Buck Hunt)



US Forest Service
Bureau of Land Management
National Parks
Private**
Other Gov't Agency
Lake

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

** Private lands may be open or closed to deer hunting -- inquire locally.

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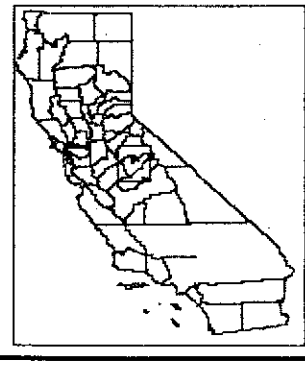
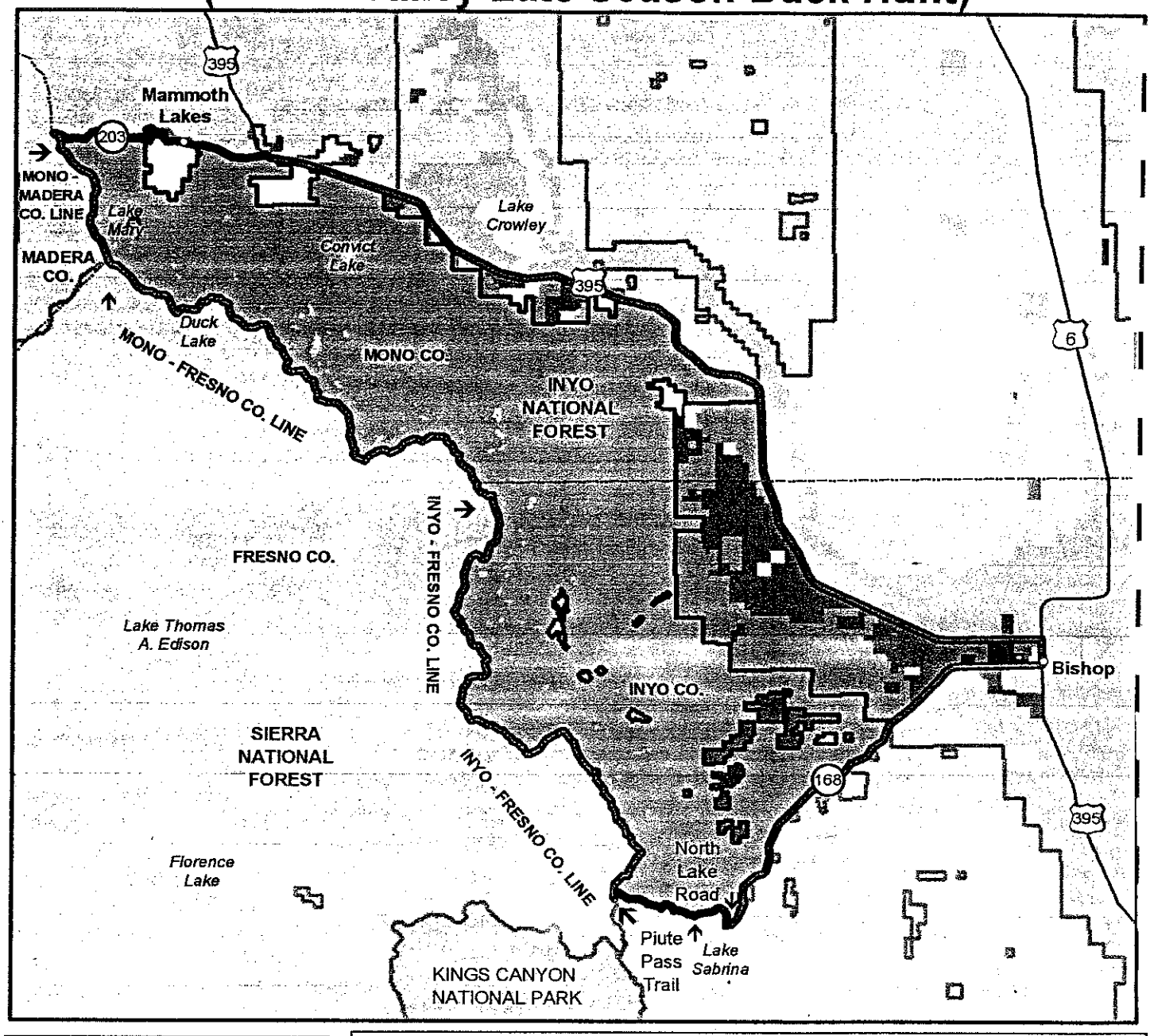
Dept. of Fish and Game, Oct. 1999



Hunt Number G-39
(Round Valley Late Season Buck Hunt)



Department of Fish and Game
January 2004

- US Forest Service
- Bureau of Indain Affairs
- Bureau of Land Management
- CA Dept. of Fish and Game
- Private**
- Other Gov't Agency
- National Parks
- Lake
- County Line
- Deer Hunt Zone
- Boundary Feature Change

- Interstate Route
- U.S. Route
- State or County Route

0 5 10 Miles

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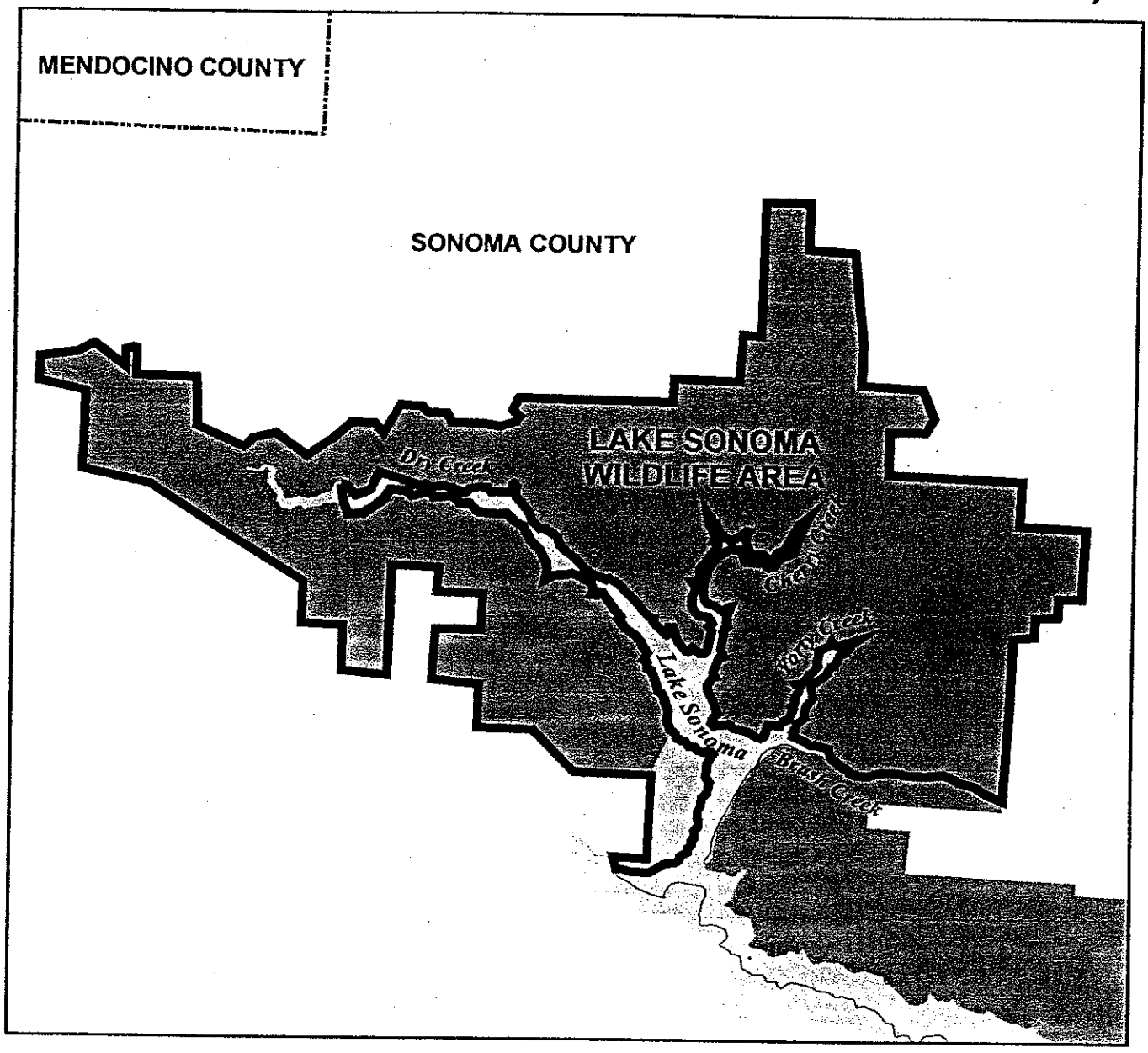
Hunt Number J-1
(Lake Sonoma Junior Either-Sex Deer Hunt)



Deer Hunt Zone

CA Dept. of Fish and Game

Lake

Military

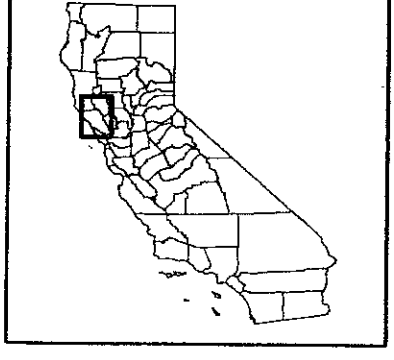
County Line

Private **

** Private lands may be open or closed to deer hunting– inquire locally.

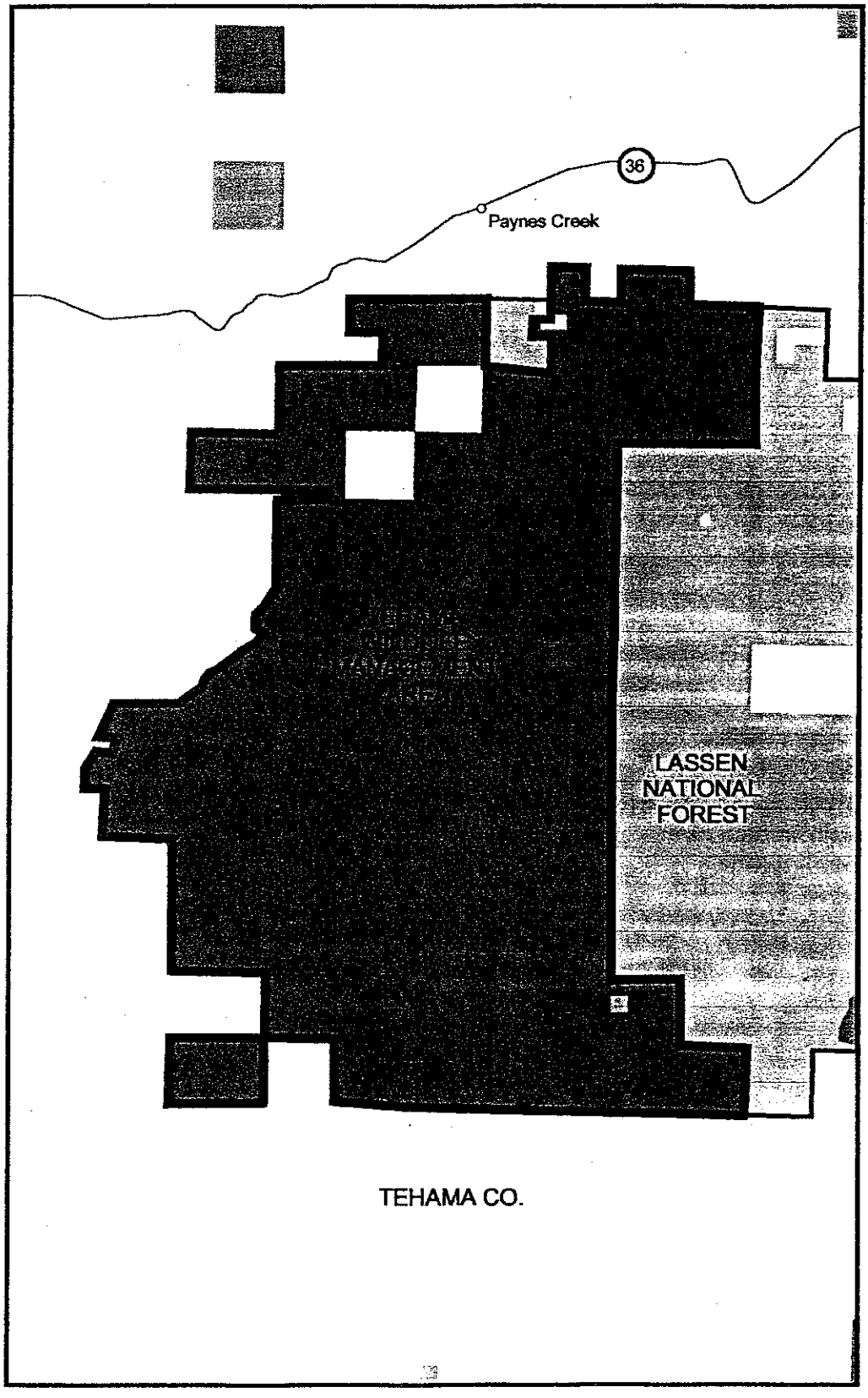
This map should serve only as a guide to the general locations of deer hunting zones. Detailed leagal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations"

0 1 2 Miles



Department of Fish and Game
January 2004

Hunt Number J-3
(Tehama Wildlife Area Junior Buck Hunt)



US Forest Service
Bureau of Land Management
CA Dept. of Fish and Game
Private**
Other Gov't Agency
Lake
Refuges*

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

1 0 1 2 Miles

* Stateprotected reserves closed to deer hunting.
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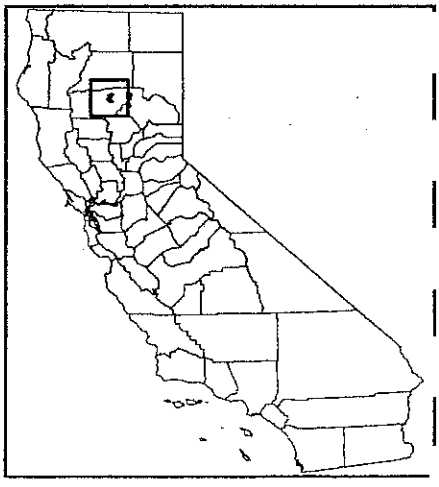
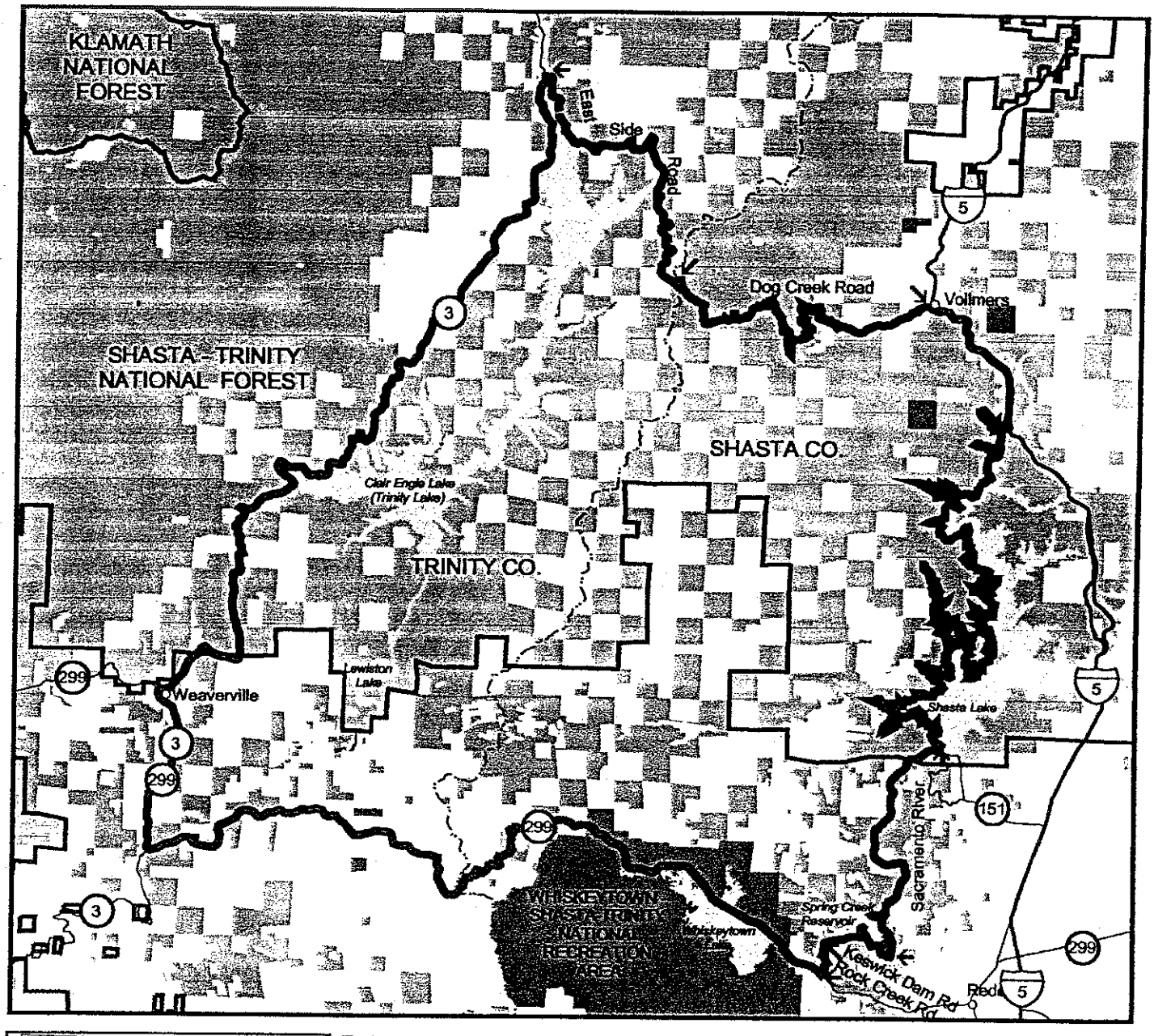


Department of Fish and Game
Oct., 1999

Hunt Number J-4
(Shasta-Trinity Junior Buck Hunt)



US Forest Service
Bureau of Land Management
CA Dept. of Fish and Game
Private**
Other Gov't Agency
Lake
County Line
Deer Hunt Zone
Boundary Feature Change

Interstate Route
U.S. Route
State or County Route

1 0 1 2 3 Miles

** Private lands may be open or closed to deer hunting -- inquire locally.

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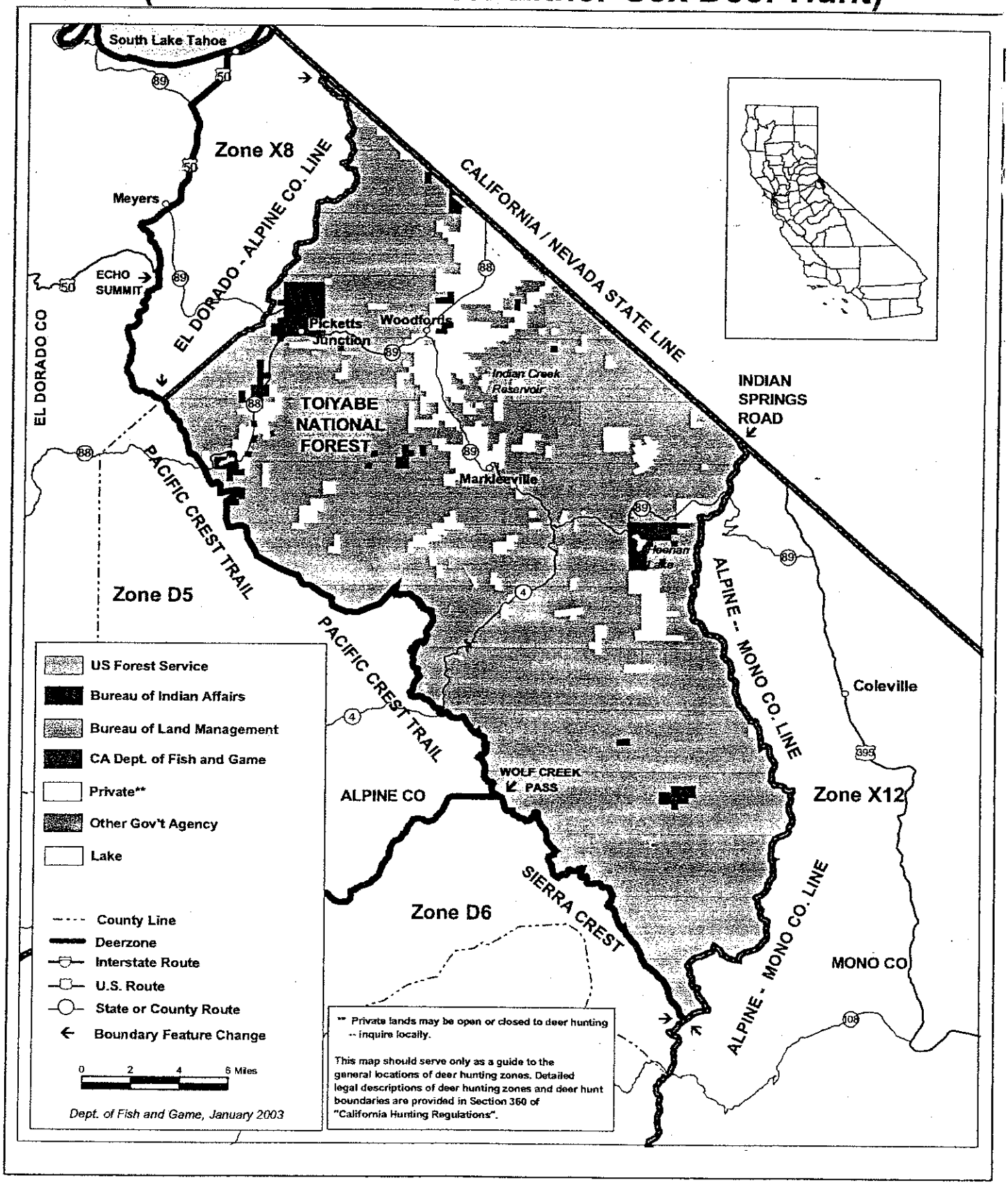
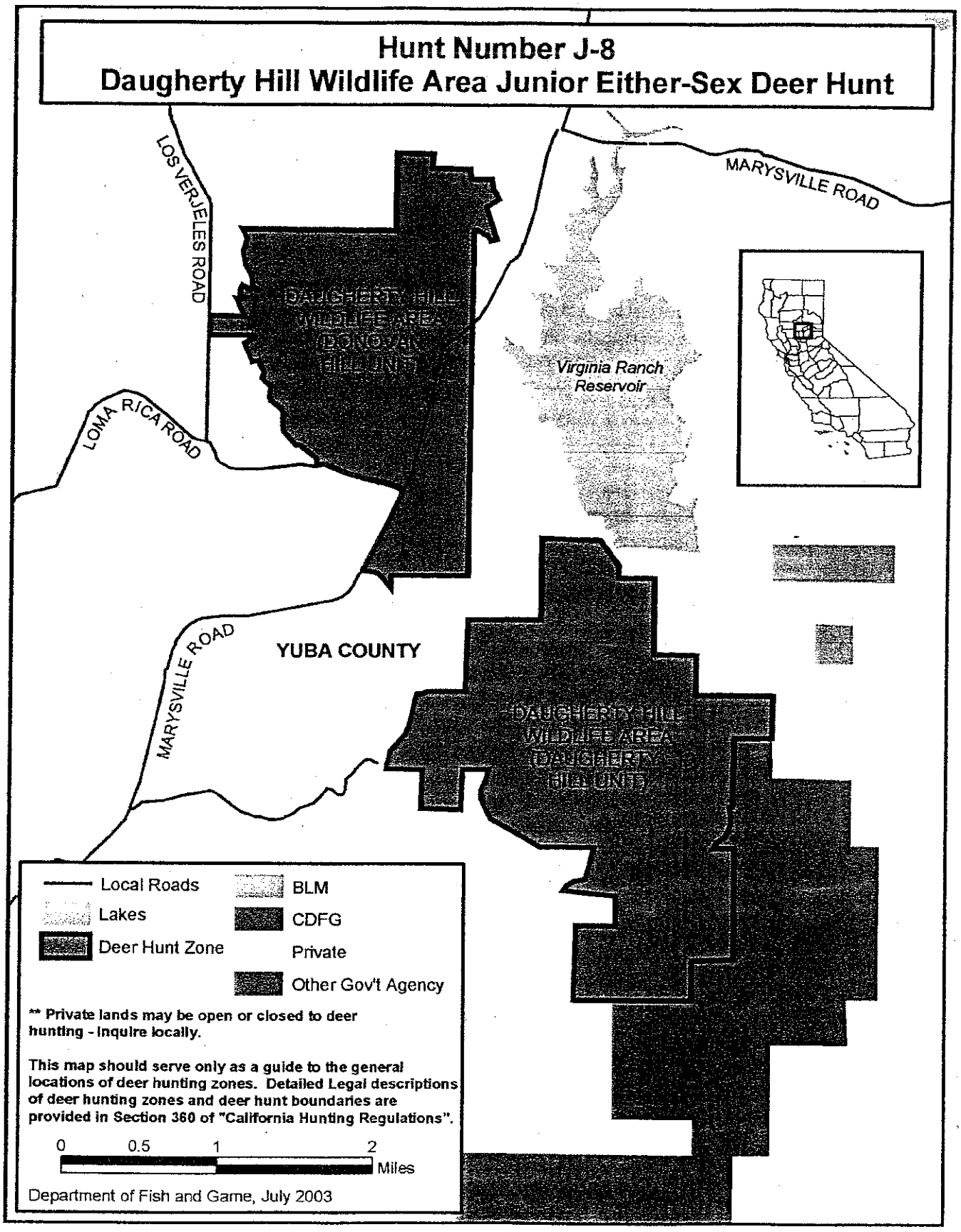
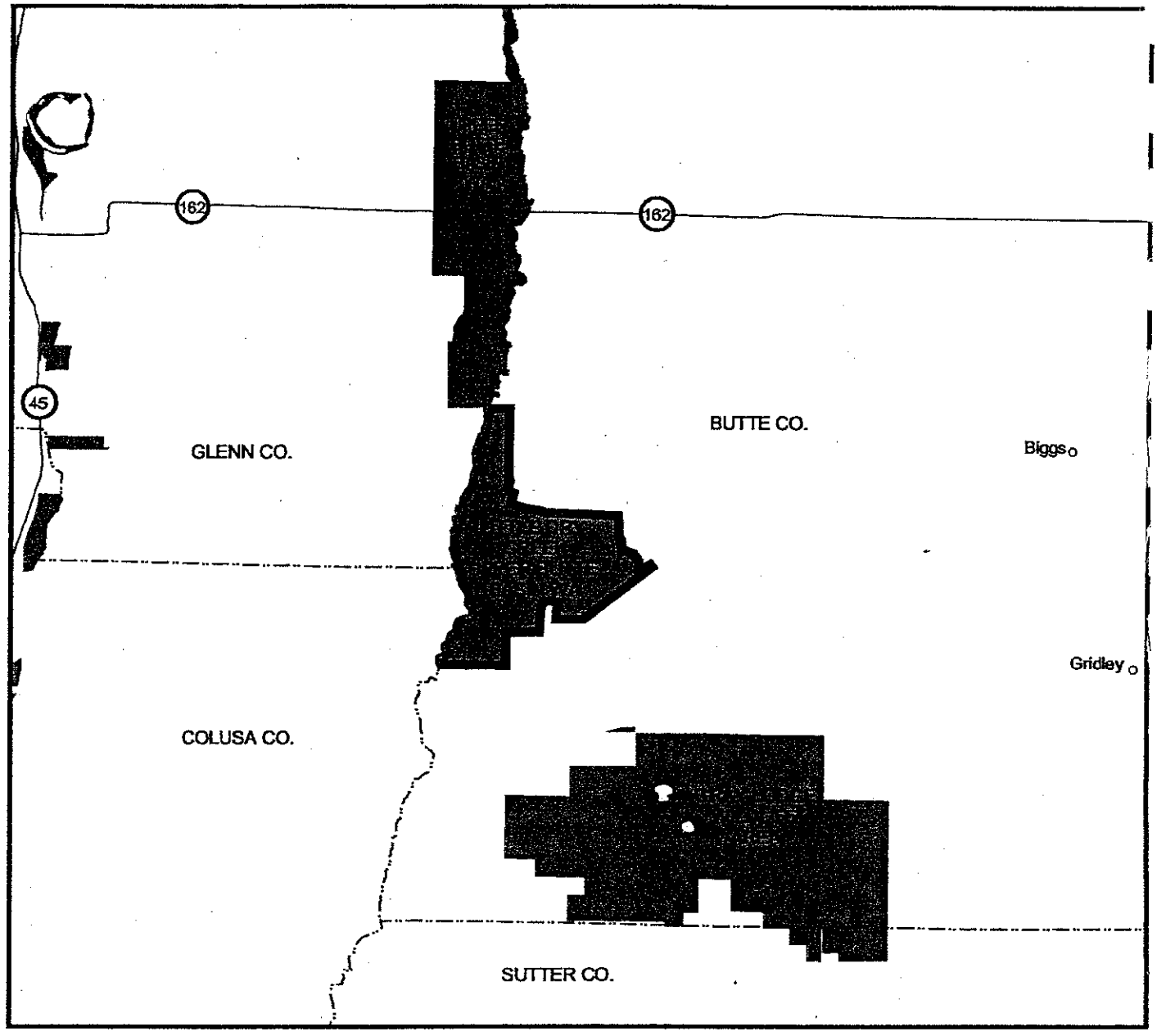
Department of Fish and Game
Oct., 1999

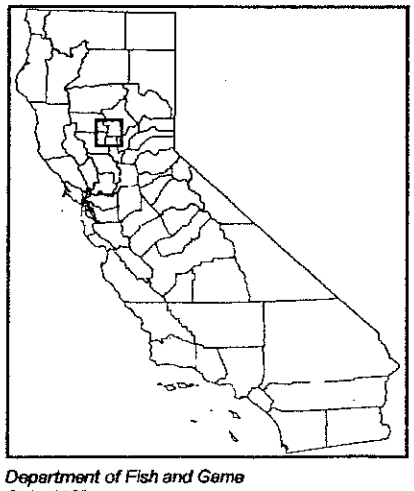
Hunt Number J-7
(Carson River Junior Either-Sex Deer Hunt)




Hunt Number J-8
Daugherty Hill Wildlife Area Junior Either-Sex Deer Hunt
LOS VERJELES ROAD
MARYSVILLE ROAD
DAUGHERTY HILL WILDLIFE AREA (DONOVAN HILL UNIT)
Virginia Ranch Reservoir
LOMA RICA ROAD
MARYSVILLE ROAD
YUBA COUNTY
DAUGHERTY HILL WILDLIFE AREA (DAUGHERTY HILL UNIT)
Local Roads
Lakes
Deer Hunt Zone
BLM
CDFG
Private
Other Gov't Agency
** Private lands may be open or closed to deer hunting - inquire locally.
This map should serve only as a guide to the general locations of deer hunting zones. Detailed Legal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 360 of "California Hunting Regulations".
0 0.5 1 2
Miles
Department of Fish and Game, July 2003

Hunt Number J-9
(Little Dry Creek Junior Either-Sex Deer Hunt)





CA Dept. of Fish and Game

Private**

Lake

County Line

Deer Hunt Zone

Boundary Feature Change

Interstate Route

U.S. Route

State or County Route

1 0 1 2 3 Miles

** Private lands may be open or closed to deer hunting -- inquire locally.

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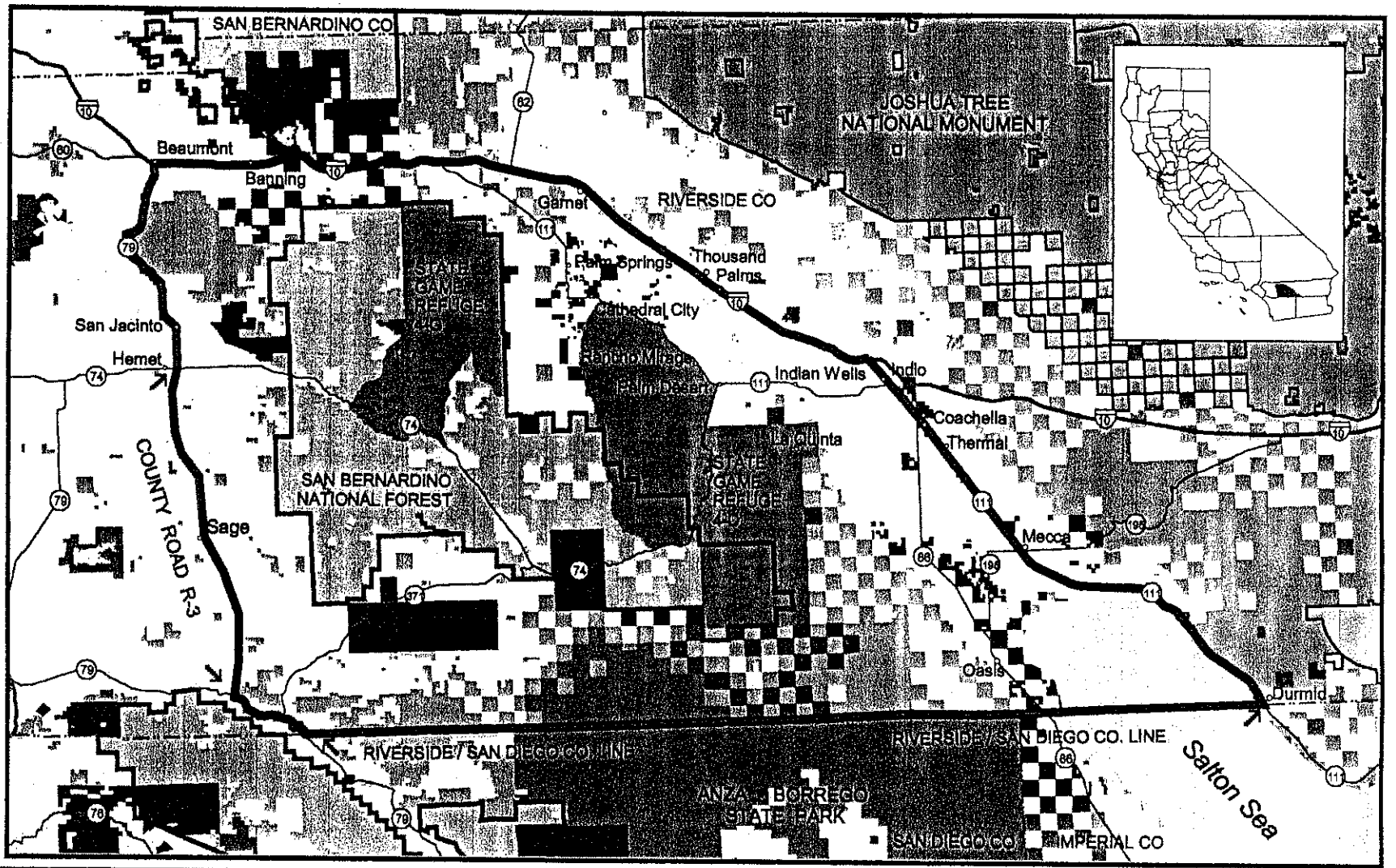
Department of Fish and Game
Oct., 1999

Hunt Number J-14
(Riverside Junior Either-Sex Deer Hunt)



US Forest Service
US Fish and Wildlife Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game

Refuges*
Private**
Other Gov't Agency
Lake

0 2 4 6 8 Miles

County Line
Deerzone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

* State protected reserves closed to deer hunting.
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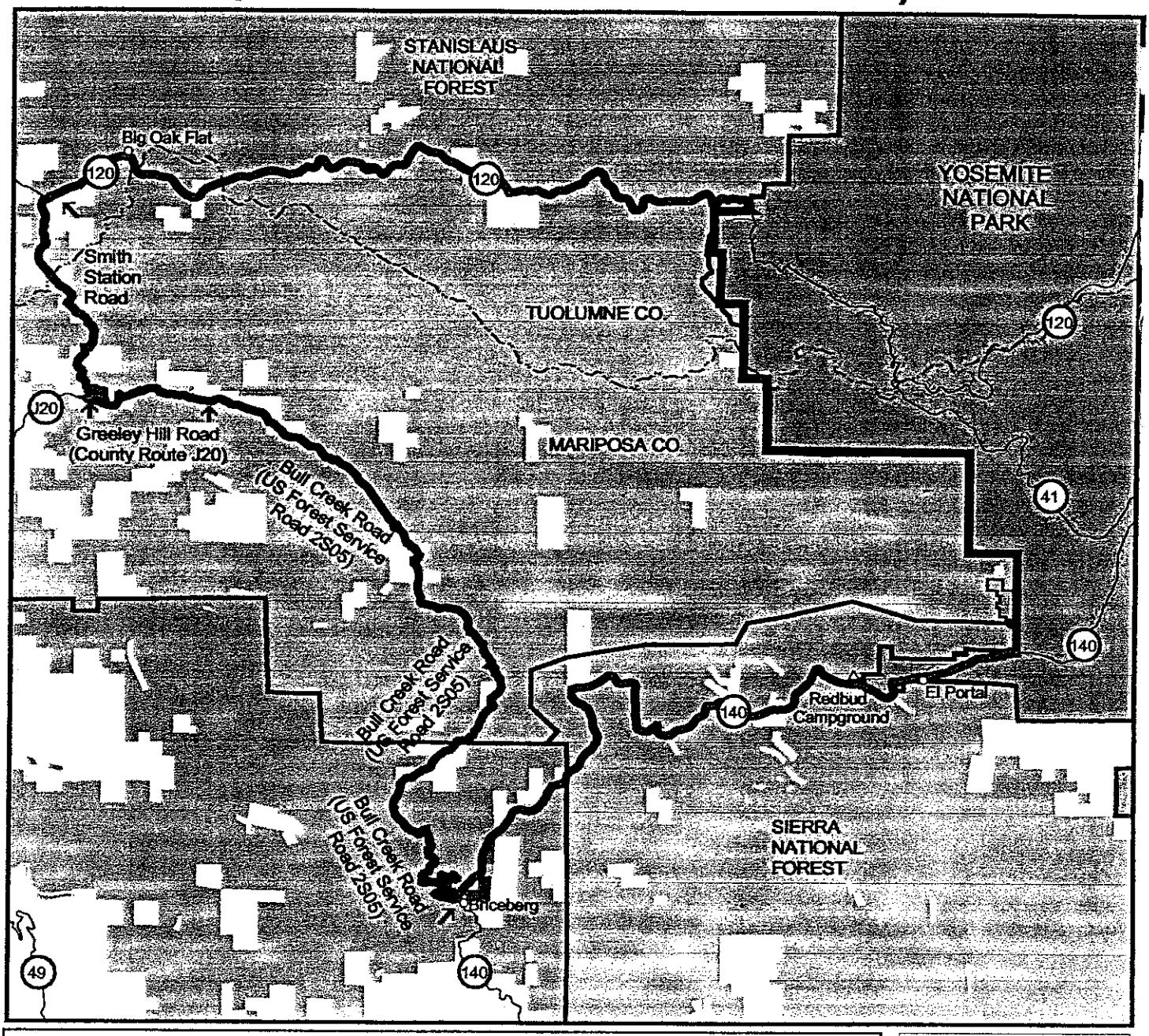
Dept. of Fish and Game, May 1999

Hunt Number J-15
(Anderson Flat Junior Buck Hunt)



US Forest Service
Bureau of Land Management
National Parks
Private**
Other Gov't Agency
Lake

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

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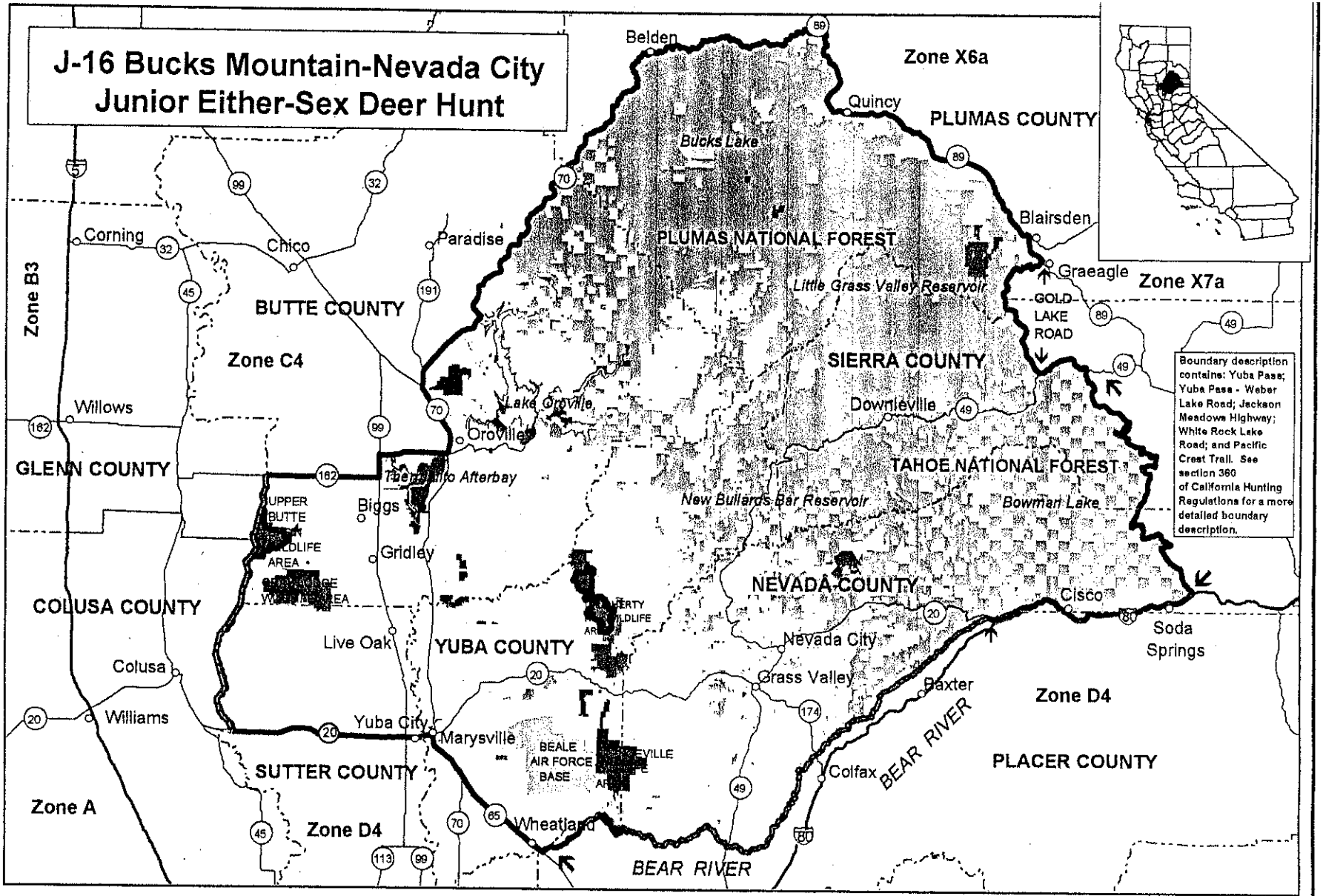
Dept. of Fish and Game, Oct. 1999

J-16 Bucks Mountain-Nevada City Junior Either-Sex Deer Hunt



US Forest Service
US Fish and Wildlife Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game

Military
Private**
Other Gov't Agency
Lake

0 5 10 15 Miles

County Line
Deerzone
Interstate Route
U.S. Route
State or County Route
Boundary Feature change

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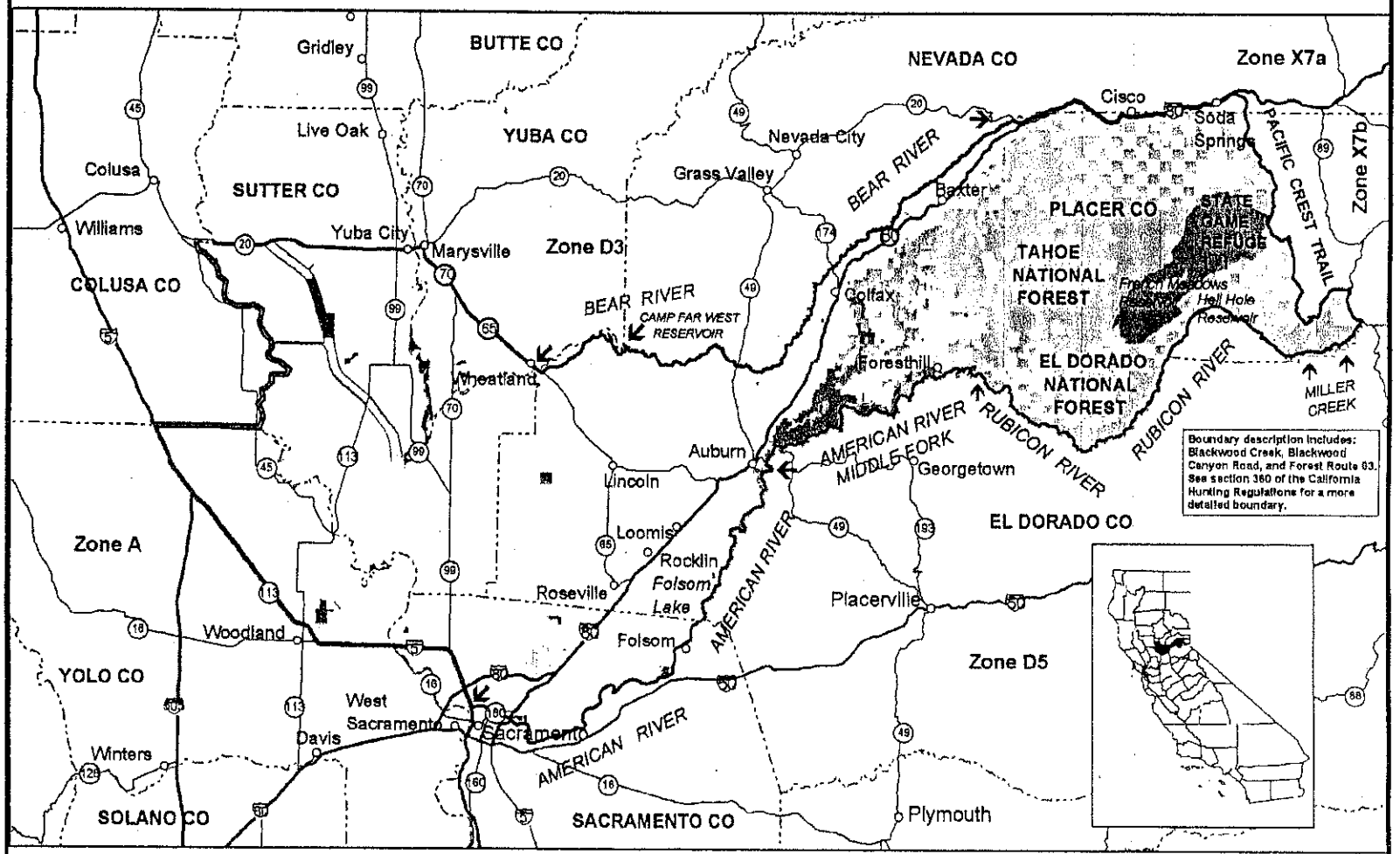
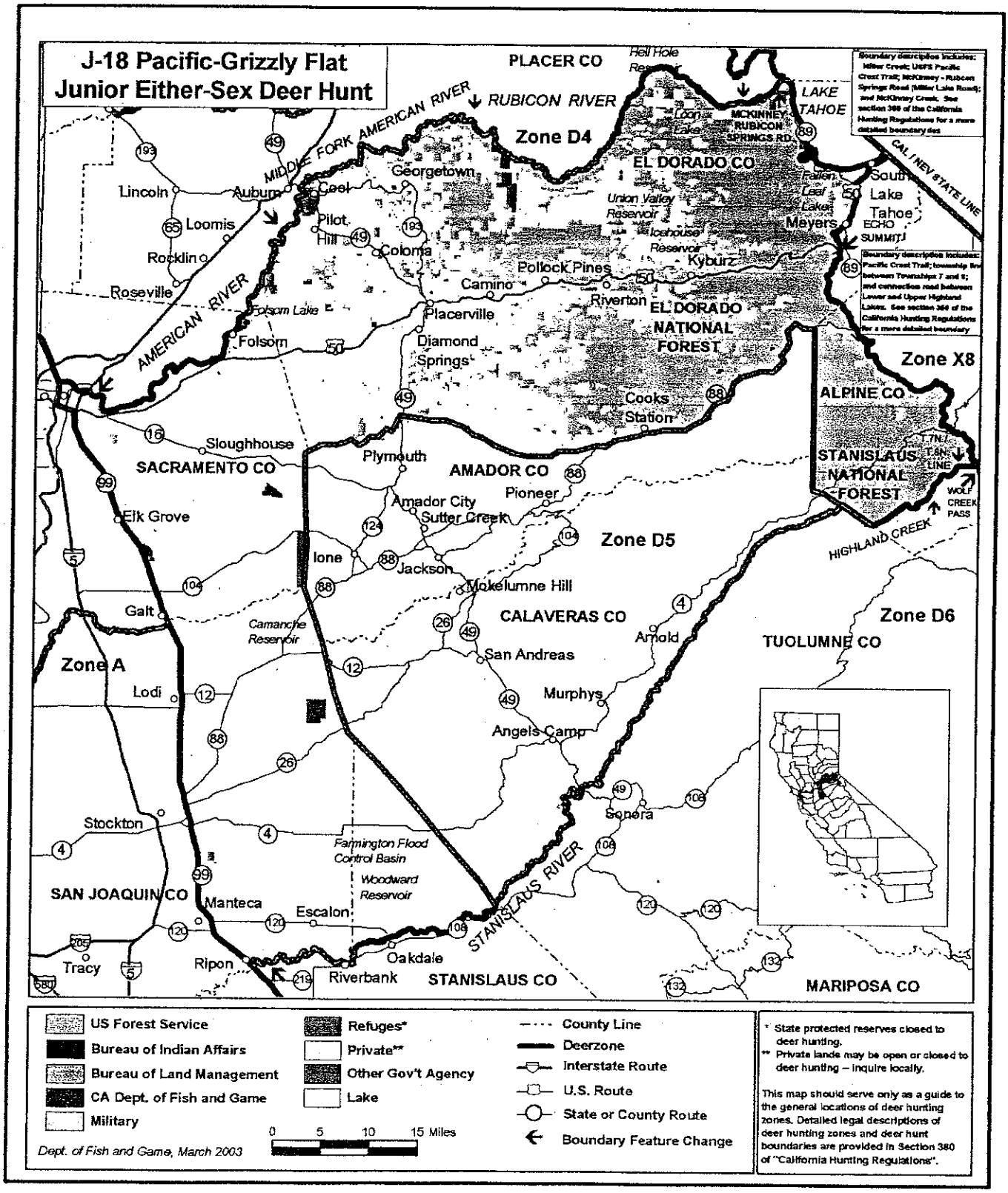
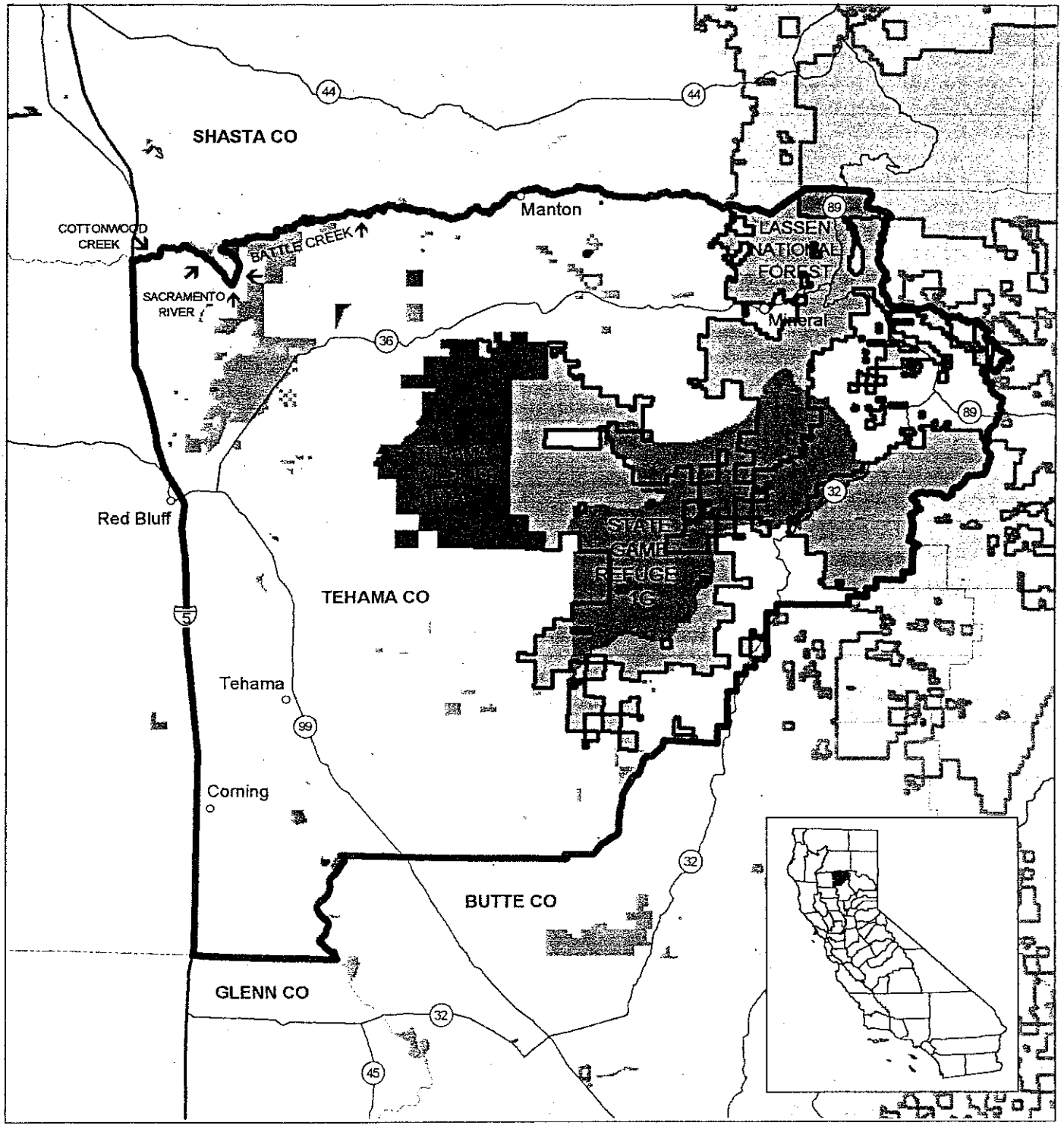
Dept. of Fish and Game, March 2003

J-17 Blue Canyon Junior Either-Sex Deer Hunt




J-18 Pacific-Grizzly Flat
Junior Either-Sex Deer Hunt
PLACER CO
Hell Hole Reservoir
RUBICON RIVER
MIDDLE FORK AMERICAN RIVER
Zone D4
LAKE TAHOE
McKINNEY RUBICON SPRINGS RD.
Loon Lake
EL DORADO CO
Georgetown
Auburn
Cool
Lincoln
Loomis
Pilot Hill
Rocklin
Roseville
Coloma
Union Valley Reservoir
Icehouse Reservoir
Fallen Leaf Lake
Meyers
South Lake Tahoe
ECHO SUMMIT
Kyburz
Pollock Pines
Camino
Riverton
AMERICAN RIVER
Folsom Lake
Folsom
Placerville
Diamond Springs
EL DORADO NATIONAL FOREST
Zone X8
ALPINE CO
Cooks Station
Sloughhouse
SACRAMENTO CO
Plymouth
AMADOR CO
STANISLAUS NATIONAL FOREST
T7N
T8N LINE
WOLF CREEK PASS
Elk Grove
Amador City
Sutter Creek
Pioneer
Zone D5
HIGHLAND CREEK
Ione
Jackson
Mokelumne Hill
Galt
Camanche Reservoir
CALAVERAS CO
Zone D6
Arnold
TUOLUMNE CO
Zone A
San Andreas
Lodi
Murphys
Angels Camp
Stockton
Farmington Flood Control Basin
Woodward Reservoir
Sonora
STANISLAUS RIVER
SAN JOAQUIN CO
Manteca
Escalon
Tracy
Ripon
Oakdale
Riverbank
STANISLAUS CO
MARIPOSA CO
US Forest Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game
Military
Refuges*
Private**
Other Gov't Agency
Lake
County Line
Deerzone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change
0 5 10 15 Miles
Dept. of Fish and Game, March 2003
* State protected reserves closed to deer hunting.
** Private lands may be open or closed to deer hunting – inquire locally.
This map should serve only as a guide to the general locations of deer hunting zones. Detailed legal descriptions of deer hunting zones and deer hunt boundaries are provided in Section 380 of "California Hunting Regulations".

Hunt Number J-21
(East Tehama Junior Either-Sex Deer Hunt)



US Forest Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game
National Parks
Refuges*
Private**
Other Gov't Agency
Lake
0 5 10 Miles
County Line
Deerzone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

* State protected reserves closed to deer hunting.
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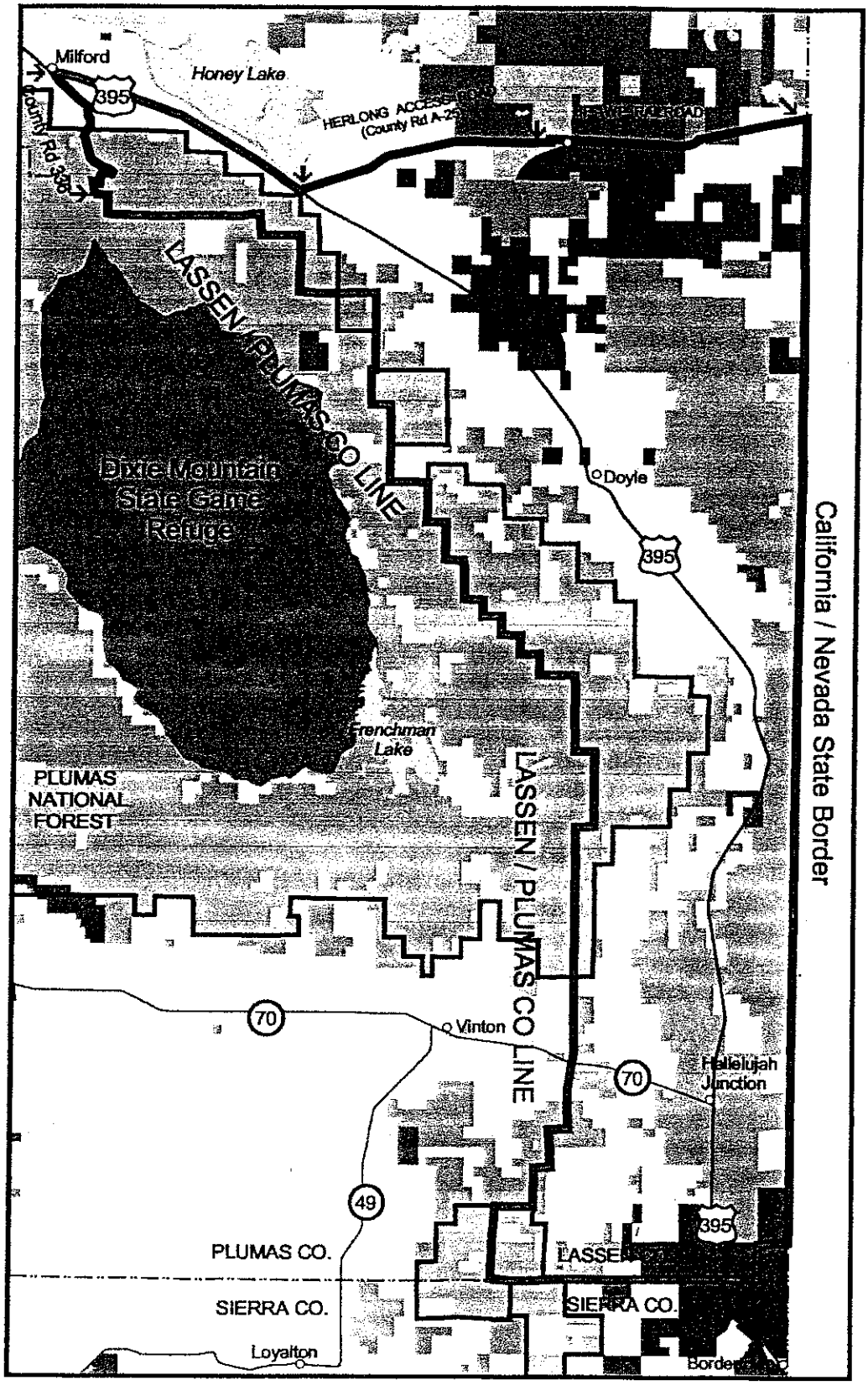
Dept. of Fish and Game, January 2004

Hunt Number M-3
(Doyle Muzzleloading Rifle Buck Hunt)



US Forest Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game
Refuges*
Military
Private**
Other Gov't Agency
Lake

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

2 0 2 4 Miles

* State protected reserves closed to deer hunting.
** Private lands may be open or closed to deer hunting -- inquire locally.

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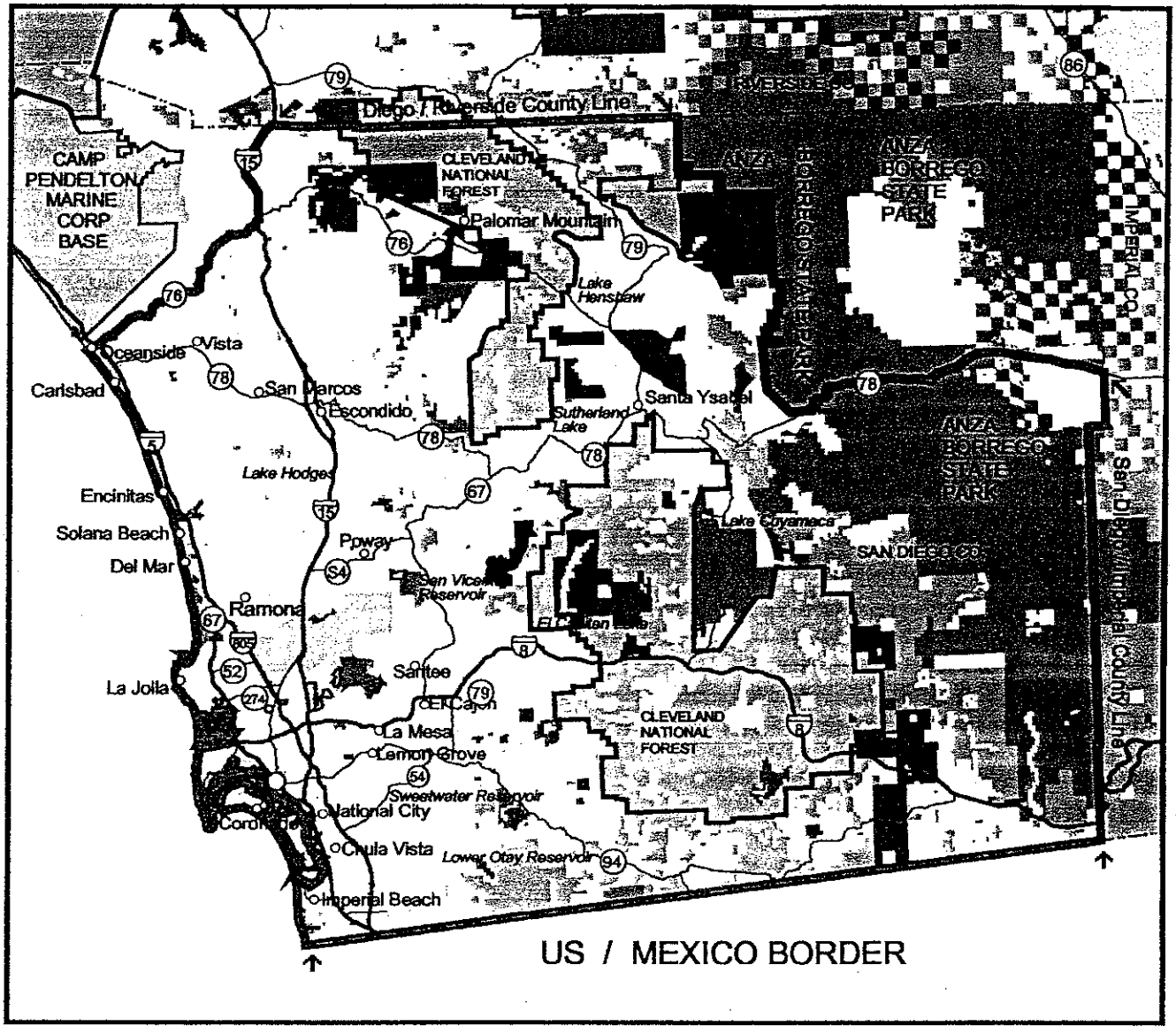
Department of Fish and Game
Oct., 1999

Hunt Number M-6
(San Diego Muzzleloading Rifle Either-Sex Deer Hunt)



US Forest Service
Bureau of Indian Affairs
Bureau of Land Management
CA Dept. of Fish and Game
Refuges*
Military
Private**
Other Gov't Agency
Lake

3 0 3 6 9 Miles

County Line
Deer Hunt Zone
Interstate Route
U.S. Route
State or County Route
Boundary Feature Change

* State protected reserves closed to deer hunting.
** Private lands may be open or closed to deer hunting – inquire locally.

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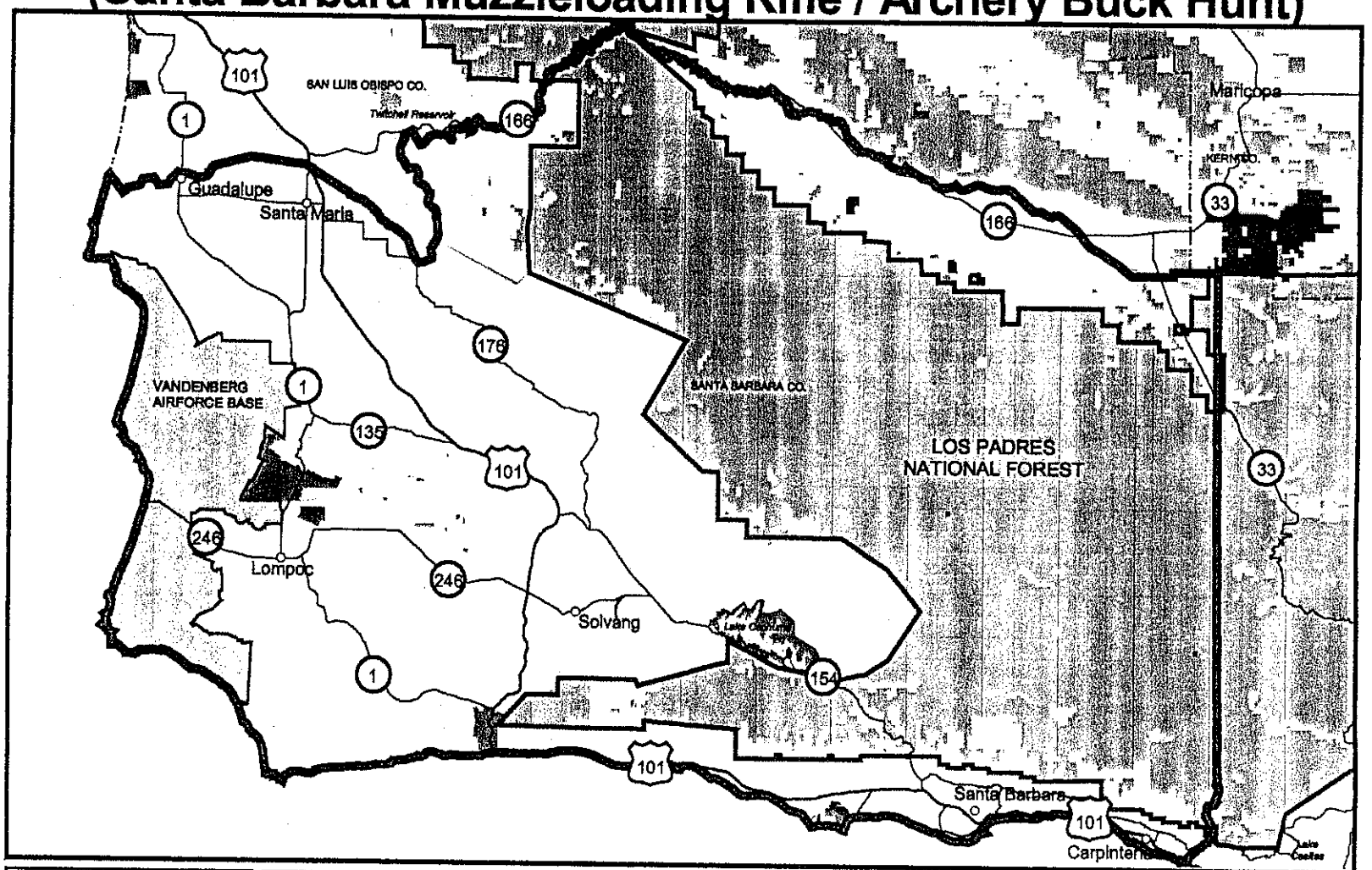
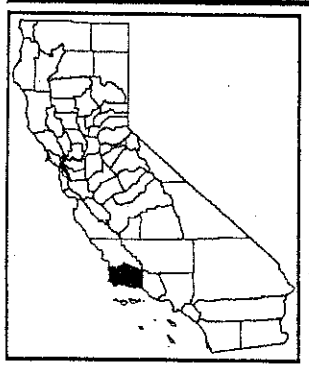
Department of Fish and Game
Oct., 1999

Hunt Number MA-3
(Santa Barbara Muzzleloading Rifle / Archery Buck Hunt)





- US Forest Service
- Bureau of Indain Affairs
- US Fish and Wildlife Service
- Bureau of Land Management
- CA Dept. of Fish and Game
- Military
- Private**
- Other Gov't Agency

- Lake
- County Line
- Deer Hunt Zone
- Interstate Route
- U.S. Route
- State or County Route
- Boundary Feature Change

3 0 3 6 9 Miles

** Private lands maybe open or closed to deer hunting -- inquire locally.

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Department of Fish and Game.
Oct. 1999

APPENDIX 7

Analysis Methodology

ANALYSIS METHODOLOGY

Many sources of information and various data analysis techniques were used by the Department to determine the environmental effects of the proposed project. The following section describes these data elements, data collection, and data analysis techniques.

POPULATION MANAGEMENT

Overview (Management by Objectives)

Much has been said and written about the dynamics of deer populations over the past several decades by ecologists, wildlife managers, hunters, and others. The following discussion is thus necessarily brief. For additional discussion, see Caughley (1976) and McCullough (1979, 1984).

Mule and black-tailed deer populations have rather high reproduction potential, compared to other large mammals. Females are capable of producing twin fawns every year and occasionally can produce triplets. Thus, populations are capable of growing rapidly. However, in actuality, this potential is almost never attained, because populations are influenced by limited forage, predation, hunting, and numerous other mortality factors.

Of these factors, the single most important controlling factor of the population is the amount and quality of forage available to the individuals (Longhurst *et al.* 1952, Taber and Dasmann 1958, Russo 1964).

The difference between potential and realized productivity (net number of fawns that survive) begins with fetal rates. Not all females carry the maximum number of fetuses. This difference is generally age-specific (Andersen 1981). Adult does generally breed and carry twins. In high-density populations, yearling females typically do not breed or have reduced fetal rates. Conversely, in low density situations, fawns, as well as yearlings, may breed and carry twins. Reductions in realized productivity continue after the birth of fawns, with fawn mortality being highest in high-density population situations. The net result of these interactions is that realized productivity is high at low density and low where densities are high. It is important to note that density, as used here, is not absolute, but relative to habitat carrying capacity. The same level of productivity can be realized from populations of vastly different absolute density if their habitats are also different in quality. Productivity can be influence by human activities, either through direct density reduction or habitat manipulations.

Sources of mortality in deer populations are numerous and widely varied in their effects on populations. There are two basic classes of mortality in a deer population: chronic and traumatic (McCullough 1984). Chronic mortality includes those things to which all animals are subject, including old age, disease, and malnutrition, as well as

heavy parasite loads and the effects of nonlethal accidents. It is a continuous, slow-acting process that would occur in the absence of any other factor. Traumatic mortality is neither slow nor inevitable. Predation, hunting and fatal accidents are examples of traumatic mortality. Mortality rates of both types tend to be density dependent, but either can also be density independent.

Hunting

To effectively investigate the combined effects of hunting on a deer population, a population model which acts dynamically should be employed. Population models can range from simple word models (the statement "deer are born, grow up, reproduce and die" is a grossly simple word model of a population process) to complex and sophisticated mathematical abstractions. Some models are empirical (that is, based on observational data), and others are theoretical. Many models are useful in helping to frame conceptualizations of population processes, resulting in testable predictions about the subject at hand. Simulation modeling, in which the dynamics of a population are mimicked through bookkeeping of birth and death rates, is useful in wildlife management for exploring population responses to changes in management strategies, i.e., hunting (Walters 1986). These modeling and population processes (compensatory and additive) will be discussed in detail below.

Compensatory Mortality and Recruitment

The stock-recruitment model (McCullough 1984, Ricker 1954) is useful for conceptualizing population processes and density-dependent responses. This model shows the population's response to changes in density in terms of net recruitment (i.e., the survival of fawns). It has the advantage of not requiring assumptions about internal birth and death rates, and it can be empirical.

The fundamental assumption of the stock-recruitment model is that there is some process that changes fawn survival as a function of density and that it acts to reduce fawn survival as density increases (the converse is also true). There is a large body of evidence indicating that this is the case among population of deer (Clutton-Brock *et al.* 1982, McCullough 1979).

Population size (Stock) is measured as the residual size after all mortality factors have operated for any given year. As density increases, the recruitment rate (recruits/stock) drops. This is the definition of a density-dependent response and is the basis for the compensatory response of deer populations to hunting.

The rate at which a population increases is dependent upon its density relative to the carrying capacity of its habitat. At low densities, the rate of increase is slow, because there are few females, even with the high birth and survival rates observed at this level. At moderate densities, the rate accelerates due to increasing numbers of breeders and still high birth rates. As the population approaches its habitat

carrying capacity, the birth and survival rates of fawns begin to decrease rapidly. When the carrying capacity is reached, the recruitment of fawns equals the deaths in the population (McCullough 1979). Under some circumstances, a population can temporarily exceed its carrying capacity. In this situation, deaths will exceed births, and the population will decline. The rate of increase of the population is thus dependent upon its own density relative to the carrying capacity of their habitat (McCullough 1979, McCullough 1990).

Because of this density-dependent relationship, deer populations exhibit a compensatory response to hunting mortality (Wallmo 1981, McCullough 1979 and others). This compensatory response is a population mechanism in which either the mortalities normally suffered through other mechanisms decline (compensatory mortality), or the birth and survival of fawns increase (compensatory recruitment), or both. In other words, when a deer population is reduced below its carrying capacity due to an increase in mortality by a particular force, such as hunting, either the remaining deer will experience a compensatory decline in mortality as a result of other forces, such as starvation, or an equivalent number of fawns will be born and recruited into the population during the following breeding season, or both. As a result, a year, (or thereabouts) later the population will again approach the carrying capacity of the habitat. This assumes that there have been no significant changes in the carrying capacity or some other factor. In addition, it must be recognized that there are limits to these compensatory responses, and responses are likely to vary with circumstances. The Department's analysis of the proposed project is based on this theory and application.

To achieve maximum sustained yield from a deer population, their density must be maintained at rather low levels. Objectives to maximize residual population size and maximum sustained yield are necessarily mutually exclusive. This has important implications for harvest management, as harvesting to achieve maximum sustained yield suppress the total population below its maximum potential. Premortality spring population size (after fawns are born) is thus below the carrying capacity of the range.

Sustainable yield is rather low at high density because of the number of recruits (fawns). This is the situation for the majority of deer herds in California. Population sizes are at or near the range carrying capacity, and the yield is low because recruitment of fawns is low. By increasing and maintaining harvest levels (within limits); the population will stabilize at a lower population size with a higher annual recruitment rate. Some level of yield (harvest) is at least potentially sustainable at virtually any population level. Thus, there is no biologically "correct" population level for harvest.

Additive Mortality Considerations

While it is commonly recognized that deer are density dependent and populations exhibit compensatory mortality and recruitment responses to hunting, it has recently

been suggested that hunting mortality, under certain circumstances, may be "additive." Additive mortality occurs when harvest rates exceed the ability of the population to recruit young animals. Wood *et al.* (1989) found, while studying the ecology of sympatric mule deer and white-tailed deer populations in Montana, that hunting was the major mortality factor among adults. Moreover, they found that natural mortality rated between fawns and adults were not affected by population density. During the study, liberal hunting regulations and high mortality (21 percent for adult females and 58 percent for adult males), combined with reduced fawn survival, appeared to be the major factors influencing population declines in the study area for both species during 1984-87.

These finding have been the subject of much scientific debate (McCullough pers. Comm.). It has been suggested that these data can and should be interpreted differently. This new interpretation does not rule out the possibility that the Montana deer population may actually be exhibiting a compensatory response. Nevertheless, because deer harvest management in California is conservative (harvest is restricted by zones and quotas, and primarily male deer are harvested), it is doubtful that the conditions found in the Montana study exist in California. The proposed harvest level is expected to remove five to seven percent of the total deer population.

Impacts of Various Hunting Strategies

Bucks-Only Harvest

The predominantly bucks-only hunting strategy in California removes five to seven percent of the total deer population annually. This hunting strategy generally removes 30-50 percent of the adult bucks from the population. Because adult bucks comprise only 10-15 percent of the population, the effect of the hunt on the local deer population is negligible, and over the annual cycle, the population size is not affected.

Buck hunting in California varies throughout the State when comparing one hunting zone to another or one additional hunt to another. Most variation between hunts is a result of three elements of the hunting strategy for the area. These elements are the timing of the hunting season, type of buck to harvest and number of bucks available. Each of these elements is discussed further below:

Season Length and Lateness

In California, buck hunting seasons (archery and general rifle seasons) correspond with the time of best condition of the buck. This situation usually occurs in the fall of the year, just prior to breeding (November and December). Because the breeding season for deer varies across the State, hunting seasons generally occur earlier, where deer breed earlier and later where breeding is late.

In some areas of the State where the first fall storms are somewhat predictable from year to year, hunting seasons may be timed to these periods. Because snow and winter weather conditions tend to make deer (especially migratory deer) more available, hunting seasons during stormy weather usually result in a greater harvest. Where additional bucks are available to harvest, timing the season with the weather can increase harvest; this usually means a later season.

In some cases (e.g., Zone C-4), where predictable fall storms are associated with deer migrating from summer ranges to winter ranges, the hunting seasons are closed during this period of increased vulnerability to maintain the proportion of bucks in the population at a reasonably high level, while still providing many hunters the opportunity to hunt the herd on both summer ranges and winter ranges (see Eastern Tehama Deer Herd Management Plan).

The length of the season can affect harvest level, but is generally considered less effective than lateness of the season. The major effect of shortening or lengthening seasons is to provide adequate time for a hunter to pursue and harvest a buck. This length of time is generally shorter for the northeastern portion of the State, because the habitat is more open and deer are visible from longer distances than in areas of dense timber, for example. These northeastern hunt areas are more "huntable," and less time is generally necessary for pursuing and harvesting a buck.

Most general deer seasons are two to five weeks in duration. Based on tag returns, most deer are harvested during the opening and closing weekends of the seasons. However, in some years, deer harvest is increased during the season by inclement weather conditions, as bucks are more available to the hunters. Consequently, because few deer are taken during mid season, the effect of longer seasons on buck harvest is usually not significant.

Antler Restrictions

In mule deer, only the males produce antlers. Antlers are grown during the late winter and spring and are lost following each winter. Antler development is affected by a combination of factors, including age, nutrition and genetics. Generally, older bucks have larger antlers, with more antler points than younger bucks. Also, bucks consuming better-quality forage tend to grow larger antlers with more antler points than bucks on low nutritional diets.

Most deer hunting in California are for bucks, forked horn or better, which have two or more antler points on one or both sides. Until 1990, the harvest in much of the northeastern portion of the State was restricted to bucks with at least three points on one side. The intent of restricting harvest to deer with

more antler points was that fewer bucks would be harvested, because there were fewer bucks with three points or better on their antlers. However, because of illegal harvest of forked horn bucks and a lack of large antlered deer in the post-season breeding populations, the Commission eliminated the three-point restriction.

Bag Limit

Harvest is restricted to one deer per tag. Current regulations allow for an individual to purchase two deer tags. Tags are issued on a first come, first serve basis and by drawing (X zones and additional hunts) up to the biological quota (zone or additional hunt quota) established by the Commission (see "Specific Project Description" in Chapter 1 of the Environmental Document Regarding Deer Hunting (ED)) for each zone and additional hunt. Therefore, the potential exists for a hunter to take two deer within two different zones or in the same zone (excluding the X zones). However, few hunters actually kill two deer in any given year. The estimated statewide hunter success varies between 17 and 22 percent annually.

Anterless Harvest

At the beginning of this section, the effects of removing adult deer from the population were discussed. In California, where anterless and either-sex deer are hunted, less than one percent of the adult does are generally harvested. Because does comprise about 50-80 percent of each herd (depending on the herd), the effect of these hunts on the local deer population is small. The hunt may reduce the local post-season population size by some small percentage, relative to the preseason population. Deer removed by these hunts are replaced by surviving fawns during the next late spring/early summer; hence the herd size is not affected over the annual cycle.

Antlerless and/or either-sex deer hunts make up a very small proportion of the deer hunts available to the public. These hunts are conducted as additional or PLM hunts and are limited to local areas with restrictive hunter quotas. About two percent of the deer hunting permits issued annually are for the harvest of anterless or either-sex deer.

POPULATION DATA REQUIREMENTS

The primary job of a wildlife manager is to maintain populations of wildlife in healthy condition and in balance with their habitat. With this in mind, there are three general classes of information needed: information on the size of the population, on the condition of its members and on the condition and quantity of its habitat. This information is needed in the dynamic sense. That is, trends in these factors need to be monitored. With this information, management can proceed on a sound biological basis. The precision of measurements needed (which will likely determine the method of study to be used) may vary from herd to herd, according to the objectives of deer herd management plans.

The Department gathers a variety of information about deer. The following section describes some of the techniques used and types of information collected.

Herd Composition Data

Herd composition counts are intended to give and estimate of the sex and age structure of deer populations, which are used to monitor productivity and survival of fawns. Along with hunter harvest summaries, they are the most consistently gathered data for deer herds in California. Finally, they are useful in estimating population size.

The composition survey is an observational study technique and, to result in a sex and age ratio, must be applied when all animals are equally observable. This is because results are based on ratios rather than on the actual number of animals counted. It is well known that all members of a deer population are not equally observable at all times (Wallmo 1981). Bucks, in particular, are more difficult to observe than does. Consequently, fall composition counts are generally conducted during the breeding season, when bucks are most observable.

The objective of spring counts is to estimate winter fawn loss and net recruitment. The ratio obtained from spring counts is fawns:100 adults rather than fawns:100 does, but this value can be converted to fawns:100 does by assuming the buck-to-doe ratio has not changed since the end of the previous hunting season. Problems are often encountered while collecting these data, as fawns may be mistaken for adults. This problem is addressed by the Department by ensuring, where practical, that the same individual collects both the fall and spring data. This procedure tends to standardize any potential biases.

Herd composition counts are conducted from aircraft, vehicles or on foot. Observations conducted from the air are useful when habitats are sufficiently open. In California, this is most practical in Great Basin habitats, particularly winter ranges and brush fields.

Sample size is an important aspect of composition surveys. As a general rule, larger sample sizes will result in higher precision of the ratios. In general, surveys that attain a minimum sample size of 200 animals are adequate. The sample size that can be achieved is dependent in part on local conditions, particularly the density of deer. It is relatively easy to obtain a sample of 300 deer under the high concentration conditions on deer winter range. The Department estimates sample size requirements to achieve a desired level of precision by using HERDCOMP, a microcomputer program.

The methods by which herd composition data are collected are detailed in the *Department of Fish and Game Deer Management Handbook.* This Handbook is available to each field Biologist to ensure that consistent data are gathered. In addition, periodic training is offered to maintain current levels of knowledge.

Harvest Data and Its Use

Harvest Reports

Annual hunter harvest records are gathered by wildlife managers for each hunt area. They are the basis for several population estimation methods. Furthermore, the harvest is one of the major criteria by which hunters judge the success of Departmental management programs. Estimated deer harvest is listed for each zone or hunt area in Table 1-1 of the ED (Chapter 1).

Harvest records are derived directly from the report card portion of the hunter's deer tag. Each report card is mailed by the successful hunter to the Department's Wildlife Programs Branch in Sacramento. The data from these harvest report cards are entered into a computer database system to facilitate an analysis of the harvest statistics. Once the data are captured in the computer, the report cards are sent to the regional unit biologist, who assigns them to herd units based on the recorded harvest location. In most cases, each Department unit biologist prepares a spot kill map from the locations reported on the returned tags. This is done by marking the location of a deer kill on a base map of the herd in question. When this is done over succeeding years, patterns of hunting pressure are shown, as well as deer concentration areas and migration corridors of migratory herds.

Nonreported harvest rate is measured by a statewide survey of locker plants or butcher shops where harvested deer are taken for processing. The deer tag application numbers from the harvested deer reported by the locker plants, which represents a sample from many zones, are compared to the computerized harvest report card records. The proportions of these tags that are not returned to the Department through the mail represent the nonreported harvest rate. The statewide unreported harvest rate averages approximately 37 percent. Harvest can thus be corrected by adding the percent unreported to account for deer that were legally killed but not reported to provide an actual yearly take.

Aging Deer

Information most commonly collected at hunter check stations and in deer research projects includes the age of each deer examined. The age of a representative sample of harvested deer can provide useful statistics about the entire population. Age data are necessary for the calculation of birthrates ad death rated and may give a rough estimate of harvest rate (Wallmo 1981).

The most effective means of estimating age in deer involves examination of the teeth. This examination falls into two classes: tooth wear and replacement and cementum layers at the bases of the teeth.

Tooth wear is the more common of the two, and the only one that can be applied in the field. Yearling deer are very easy to age, because the fourth premolar in these animals has three cusps, rather than the two cusps found on adult deer jaws. The fourth premolar is changed at about 1.5 years of age. The last (third) molar is not fully erupted until the deer is 2.5 years old. It is the wear pattern of the molariform teeth that allows an estimate of age for adult deer older than three years old (Wallmo 1981).

The second method for aging deer involves the examination of cementum annuli on the roots of the teeth. Cementum is the substance that attaches teeth to the jawbone, and some cementum is laid down at the base of the tooth each year. The method is based on the fact that, in seasonal environments, most animals only grow cementum during the portion of the year when forage resources are most available. When cementum growth starts and stops, it leaves a noticeable band at the base of the tooth for each growth period. These bands can be countered after the base of a tooth has been cut into thin layers, much like counting the growth rings on a tree.

In addition to measuring the health and condition of a herd by monitoring the recruitment of fawns with herd composition counts, the Department assesses the condition of individual animals on a local basis. Deer for this purpose are usually road-killed animals, hunter harvested animals or animals collected by the Department. The condition of does is of particular interest, because they produce fawns and the milk necessary for the early survival of fawns.

Condition indices usually involve measuring some physical attribute of the deer. Body weight and height, as well as the girth (distance around the chest), are commonly measured indicators of deer condition (Severinghaus, 1955). Fat reserves, such as kidney or marrow fat, are also measured according to standardized techniques to assess body condition. A review of techniques for measuring animal condition is presented in Kie (1988). The Department has been very active in developing standard field techniques for measuring animal condition statewide.

Habitat Monitoring and Inventory

The objective behind most habitat evaluation is to relate habitat measurements to herd performance in a quantitative manner. Unfortunately, very few studies have been able to achieve this goal. This is not necessarily due to the lack of a relationship, but more likely due to its complexity. The methods of study and analysis currently available are not adequate to the task as posed. In most cases, it is sufficient to know the overall range condition and trend, so long as there is information available about herd condition and composition.

Range Condition and Trend Measurements

Condition and trend measurements are the primary bases for making decisions as to whether ranges are over or under stocked or whether use is proper. Condition is defined as the current status of the vegetation in comparison to its potential state. It is rated as excellent, good, fair or poor. Trend is simply the direction of change in status, improving, deteriorating or static.

Range measurements are normally conducted in cooperation with the Federal land management agencies; as such, the exact procedures used are dependent to some extent on the practices of those agencies (primarily the USFS and BLM). Both agencies have their own handbooks on range evaluation, which are used to conduct surveys.

Most of the range measurement techniques suitable for the study of deer range are only applicable to Sierra Nevada or Great basin range types, specifically the winter ranges in those areas. There are few methods than can be used on annual grassland or the vegetation types of the coast ranges.

Range surveys are generally conducted on important winter ranges. In addition, measurements typically only include "key forage species." There is no definitive definition for key forage species, but, in general, they are preferred species that are in limited supply. They are also species on which measurements can easily be made. The most important example is bitter brush, which is preferred by deer on Great Basin winter ranges. The level of utilization of bitter brush is often taken as an indicator of range utilization in general.

Assessments of range condition are primarily based on two factors: the total amount of the ground surface covered by vegetation and the species composition of the ground cover. Additional factors that are considered are the age class structure of the plant community and the form classes of the plants. These factors (singly or together) are not sufficient to draw firm conclusions about the status of the range in any given year. The changes over many years are of value in evaluating habitat condition for deer. When total cover is declining, preferred forage species are decreasing and not reproducing. The plants are usually heavily hedged, making it easy to draw the conclusion that the range is overstocked and is a downward trend.

However, actual field situations are rarely that clear cut. Thus, the interpretation of range survey data may require considerable reflection and consideration of local conditions. It is difficult to draw strong conclusions from range survey data alone.

General Survey Techniques

General surveys tend to use ocular estimation techniques rather than measure with instruments. Usually, the age classes and form classes of vegetation are judged qualitatively.

The age class categories for shrubs are seedlings, young plants, mature plants and decadent plants. Seedlings are relatively easy to recognize, though they may be hard to identify as to species. Young and mature plants are a bit more difficult to distinguish. They may be of the same height, but mature plants tend to have round, fuller crowns, where young plants tend to have rounder, fuller crowns, where young plants tend to look "spiky," with pointed crowns and fewer branches. Decadent plants are defined as those plants with dead branches comprising 25 percent or more of the crown cover. The number of plants in each form class within an area is recorded.

Traditional estimates of form classes for shrubs are based on two factors: (1) degree of hedging and (2) availability. Availability is judged on the basis of height, location or density of a patch of plants. Plant parts more than five feet tall are considered out of reach and unavailable, and the same is true of plants within a brush patch so dense that deer cannot penetrate it.

Intensive Survey Techniques

Intensive survey methods rely on measurement of vegetation characteristics rather than on visual estimation. They are based on either plots or transects.

Measurements of cover and species composition are normally based on transects. Rather than using estimates of form classes and age class structure of the brush, intensive surveys rely on measurements of the degree of utilization of the plants by browsers (see "Vegetation Utilization Measurements" below).

When measuring vegetation with transects, the optimum transect length depends on the amount of vegetative cover and on the dispersion of patches. The degree of precision achieved in this type of survey is dependent on the number of transects used, which will depend in part on the personnel available for the task. A minimum of 10 transects are run, with 20 optimal. Starting points and compass bearing for transects are permanently recorded, so that valid comparisons between years can be made.

Vegetation Utilization Measurements

Utilization measurements are intended to provide an estimate of the percentage of the current year's growth taken by herbivores, be they domestic stock or wild animals. Browse utilization is most commonly measured by clipping the aboveground vegetation from an area from which grazing animals have been excluded during the growing season and comparing it to the vegetation in a grazed area.

DATA ANALYSIS

Population Estimation

Obtaining an accurate and precise estimate of the size of a deer population is difficult. There are numerous methods available, some of which are appropriate only for certain circumstances, however all have weaknesses. A true census is not needed, as a consistent index will serve management purposes.

Direct Counts

Direct counts come in two basic forms, those from the ground and those taken from aircraft. Ground counts are most often indices rather than true population estimates, because one can generally not make the assumption of having seen all animals, except in the most open of habitats. The major advantage of ground counts is that they can be conducted in the course of other data gathering, or even by driving down the road. Care must be taken to ensure that the counts taken are comparable between years, by using the same sampling areas and amounts of time spent, or by standardizing the data in terms of deer seen per day or per mile. As for other observational forms of data gathering, ground counts are best done at dusk and dawn, when deer are most active.

Aerial counts, on the other hand, are often neither indices nor estimates. In habitats in which aerial counts can be used, they may approximate total counts of the population. The habitat must be open (Great Basin winter ranges, for example) for aerial counts to succeed. Both fixed-wing airplanes and helicopters are used in aerial counts. In both cases, counts are usually conducted by two observers (other than the pilot). The observers count the animals in any group separately, then compare results before recording the data. If the counts are not in agreement, the group is usually counted again. The flight is normally arranged to cover all known habitats, and an attempt is made to find all animals.

Because the results of both ground and aerial direct counts are not estimates in the statistical sense, it is not possible to calculate confidence intervals for the count, or to statistically test the results against other values. However, counts can be repeated (if this is logistically possible), and the precision of the count can be estimated.

Track Counts

Counts of virtually any animal sign can be used as indices to total population size. For deer populations, track counts are a common index. They are not suitable for resident deer populations, however, and are most useful during migration when large numbers of deer cross areas (such as dirt roads) where tracks can be observed. The Interstate herds were monitored for many years using this method, with the counts made on a dirt road along the Oregon-California border.

For track counts to be successful as an index, the count area (road) should be perpendicular to the direction of travel of migrating animals. It must be examined for fresh tracks daily, with total number recorded. It should then be "swept" down by dragging brush, etc., along its length, in order to remove old tracks. Attention must be paid to the direction of travel of the tracks. Tracks from animals traveling in the reverse direction should be removed from the total for that day. To be useful as an index, the same section of road must be used each year, and sampling effort (number of days sampled, as well as the dates sampled) must be equal.

Mark-recapture Methods

Mark-recapture census methods are, most often used on deer herds when the animals are being captured for other reasons, such as to study migration and habitat use. It is generally too expensive to capture deer solely for purpose of population estimation. In estimating deer populations with this method, the form of recapture used is most often reobservation rather than recapture in the strict sense. Once a known number of animals have been marked and released and the animals have been resobserved along with other unmarked animals, population size can be estimated from the ratio of marked to unmarked animals.

The problems associated with mark-recapture estimates are primarily the assumptions underlying the method. The critical assumptions are (1) the population must be closed, without immigration or emigration; (2) there can be no births or deaths during the sampling period; (3) there can be no loss of marks among the captured animals; (4) all animals have equal probability of being captured and reobserved; and (5) there must be random intermixing of marked animals with unmarked animals. For estimating deer populations, the most critical assumptions are probably numbers one and three. Assumption one will rarely be met except on islands and it is difficult to determine whether or not marked animals are being lost.

To minimize violations of the assumptions, the capture and reobservation periods should be as close together as possible, and the reobservation period should be as short as possible. The precision of the method is in part dependent on the proportion of the original population that is marked and also on the number of both marked and unmarked animals seen during the reobservation period. The proportion of animals marked has ranged in practice from two to three percent to 75

percent (Connolly 1981) but should be greater than 50 percent for a satisfactory estimate.

The basic data collected, then, is the number of marked deer observed and the total number of animals observed. It is also valuable to have animals marked for individual recognition. It this is done, one should try to identify each marked animal during reobservation. The frequencies of reobservation of individually marked animals serve as a check on the assumption of equal probability of reobservation.

Pellet Group Surveys

Pellet group surveys have been used to estimate deer densities for many years, and a large body of literature concerning the method exists (Neff 1968). Deer fecal pellets decay relatively slowly, and accumulations can be used to monitor populations based on an assumed defecation rate (defecation rates have been studied extensively). The method is generally not used to estimate total herd size, because it is virtually impossible to sample all the range of a herd (even all of a seasonal range of a migratory herd). It is most often applied to the winter ranges of migratory hers, and it is also useful in indicating concentration and critical areas and in comparisons of deer use between areas.

Unfortunately, pellet group censuses tend to be rather imprecise (having high variances), and thus numerous problems are associated with the method. The basic approach involved is to establish several transects in the area of interest. These are generally given a permanent mark and are located randomly in the study area. Plots of fixed size are located at intervals along the transect. At the beginning of the sample period, the existing pellet groups are cleaned from the plot. At the end of sample period, the observer tallies all pellet groups within the plot.

From this, calculation of deer density is quite easy. The daily defecation rate is normally assumed to be 13 pellet groups per day. The total number of pellet groups observed is divided by this figure to give deer-days of use. Since the number of days in the sample period is known, as is the total area of the plot, the number of deer per area (square kilometer or mile) can be calculated by dividing deer days by total days and then dividing by the total area.

Transect lines for pellet group counts are not strictly necessary, as plots can also be located at random throughout the range without reference to a transect line, but it is easier to achieve true randomness with a series of lines than with plots scattered throughout an area. Where transect lines are used, they are generally of equal length and have an equal number of plots. Transect length is dependent on the size of the area to be sampled and may range from 100 to 1,000 meters or occasionally more. Choice of plot size is somewhat tricky, because it seems to influence density estimates, with smaller plots giving higher estimates. In general, plot size is chosen to allow efficient sampling without missing any pellet groups. The number of plots per transect (or for the study area if transects are not being used) is also variable

and depends on the degree of precision desired. In general, if deer use of the area is quite variable geographically, then more plots must be used to achieve the desired degree of precision. Thirty to forty plots may be sufficient, but in other cases, hundreds may be required.

In areas of high deer density, there can be problem in distinguishing individual pellet groups. These can only be solved by concentration on the part of the observer. Another problem with the method is that all portions of a pellet group may not lie within the plot. Normally, any group that is half or more within the plot is counted, but this is a subjective judgment, and observers strive for consistency. It is also occasionally possible to confuse deer pellets with those of other species, most notably those of domestic sheep.

Line Transect Methods

This approach is based on the idea that one can mathematically describe the probability of seeing a deer from a transect line, and that the probability decreases as the distance from the line increases. If a sample of observed distances is gathered, a probability equation can be fitted to it, and a density estimate can be calculated. A major disadvantage is the calculations involved are complex and require the use of a computer and a program called TRANSECT.

To use the method, a transect line is established, and the observer moves along it looking for deer. When a deer or group of deer is observed, the number of animals and their sexes and ages are recorded, the distance (perpendicular to the transect) of the center of the group to the transect line is estimated, and the habitat is also recorded. At the end of the transect, line length is also recorded. The basic data entered into the program TRANSECT are the line length and sighting distances of the groups observed. TRANSECT calculates an estimate of group density, which is then converted to animal density by multiplying by average group size.

Selection of transect lines is an important issue in the use of the method. It is best if randomly selected straight lines are used (Anderson *et al.* 1979). However, straight lines are frequently impossible to use in a deer habitat, and an observer must cover a great deal of ground to see sufficient groups of deer to give a reliable estimate of density. An alternative approach, explored by Fowler (1985), is the use of roads through a deer habitat as the transect line, conducting the surveys from a vehicle, either at night with a spotlight or during the early morning hours. The odometer of the vehicle is used to indicate transect length. In this manner, a large number of observations can be gathered in relatively short time. In general, major roads are not used, as they are too wide and traffic probably influences deer use of the surrounding area. Instead, small dirt roads that run through all of the habitat types that the animals occupy are selected.

It is very important that an estimate of sighting distances is accurately determined, because the density estimation process is sensitive to errors in sighting distance.

Distances are estimated to the nearest meter (or yard), and some observer training is conducted to minimize errors and biases. The vehicle is driven at slow speed so as not to miss animals. The observers need not see all animals except those that are actually on the transect (Burnham *et al.* 1980), but the more animals that are seen, the higher the precision of the density estimate. It is also important to make sure that the distance estimated is perpendicular to the transect line. In order to achieve precise estimates of density, it is necessary to observe at least 40 groups of deer per survey.

Statistical and Computer Modeling Approaches

Modern wildlife management uses models to analyze, understand and predict the outcomes and complex interactions of the natural environment. Like many other technical fields that effect everyday life of society, such as chemical engineering, aerospace technology and climatology, the science of wildlife management has found that the use of models is invaluable for predicting the effects of man-caused and natural events on wildlife and their habitats.

Models can be as simple as word association or as complex as abstract mathematical expressions. Nevertheless, the goal of a model is to aid in analyzing known facts and relationships that would be too cumbersome or time consuming to analyze manually. Some of these models describe specific systems in a very detailed way, and others deal with general questions in a relatively abstract fashion. All share the common purpose of helping to construct a broad framework within which to assemble an otherwise complex mass of field and laboratory observations. Though we often think of models in terms of equations and computers, they can be defined more generally as any physical or abstract concepts of the structure and function of "real systems" or natural occurrence.

The key in the development and use of any model is its reliability. The models used in this document have been developed based on field observation, published literature and/or expert opinion. They have been tested against known results and therefore represent reality.

The advent of the computer age, and particularly the introduction of microcomputers, has made major advances in the analysis of wildlife management data. Microcomputers are now widely available to the Department. Furthermore, there are numerous software packages available to aid in the analysis of data from deer populations and their ranges. Some of the more commonly used models are discussed below.

CIR–Change-in-Ratio Estimators

These population estimation methods take advantage of the fact that hunter harvest of deer in a sex-selective manner (such as bucks-only or limited anterless harvest strategies) causes shifts in the sex ratio of the population. When combined with

estimates of harvest, population size estimates can be calculated (Kelker 1947, Selleck and Hart 1957).

The basic data required are estimates of harvest and preseason and post-season composition counts. The difference in buck ratios between preseason and post season is taken to be a result of hunter harvest. The annual kill data are usually adjusted to account for non-reported kills and crippling loss (where tag return is mandatory, only for crippling loss). These adjustments are generally about 30 and 25 percent, respectively.

The Department uses the CIR program (see Appendix 4 of the ED) to calculate population estimates using this procedure. This program is most appropriate for giving single-year predictions about the size of a given deer population. The number of deer hunting tags for the X zones is determined annually with the results of this program. The major advantage of CIR methods for estimating populations is that the necessary data are collected annually by Department unit biologists.

Another variation of this approach has been to develop tables of the number of deer remaining in the field after the hunting season for each buck killed, given known post-hunt buck and fawn ratios (Dasmann 1952). This approach is commonly referred to as the kill ratio census method.

Reconstructed Population Methods

These methods are an offshoot of the life table approach to population analysis. There are two basic methods, however only one is suitable for use in large populations. The first is to obtain a record (such as the jawbone) of all animals in the population at their death (McCullough 1979). The age of the deer at death can thus be determined, and when all animals have been recovered, the population as it was in some time past can be reconstructed. This method, although extremely accurate, is clearly not suitable for large, free-ranging populations. Therefore, it can only be used on relatively small study populations.

The second approach utilized the resulting age distribution, together with the know buck harvest and fall herd composition data, to calculate an estimate of population size. This approach is more suitable for populations where a reasonable sample of ages can be collected from hunter-harvested bucks. The key to the method is to obtain a representative sample of the ages of the buck segment of the population. These data are acquired through examining the jaws of hunter-killed bucks at a check station or by checking hunter camps.

Once the ages have been recorded and tallied, the age class proportions can be used to calculate the estimated age class distribution of the total kill, resulting in the estimated number of animals harvested from that age class. These calculations must be made every year for a number of years before they can be used to estimate population size. It is important to note that this is not an estimate, as all bucks are

known to have been alive during the base year. It is also important to note that there is an implicit assumption that virtually all legal bucks are harvested by hunters at one time or another and that there are no losses to predation, old age, etc. This is most certainly not true in the absolute sense, but probably a reasonable approximation in heavily hunted populations. In fewer heavily hunted populations, like in California, the assumption may not be valid. However, the resulting bias is conservative, tending to minimize the herd size estimate.

When the minimum number of bucks has been calculated, the fall herd composition data for the year can be used to estimate the total population size. The major disadvantage with this method is that one must wait until four years have passed before herd size can be estimated. Nonetheless, estimates of this type are valuable for comparison with those from other models.

Stock-Recruitment Models

To effectively investigate the combine effects of hunting on a deer population, a population simulation model should be employed. Simulation modeling, in which the dynamics of a population are mimicked through bookkeeping of birth and death rates, is useful in wildlife management for exploring population responses to changes in management strategies, i.e., hunting (Walters 1986) and will be discussed further in the following section.

The stock-recruitment model (Ricker 1954, McCullough 1984) is one of the best for conceptualizing population processes and density-dependent responses. This type of model shows deer populations' response to changes in density in terms of net recruitment (i.e., the survival of fawns). It has the advantage of not requiring assumptions about the internal birth and death rates, and it can be empirical, based on observed data.

The fundamental assumption of stock-recruitment models is that there is some process that changes fawn survival as a function of density and that it acts so as to reduce fawn survival as density increases (the converse is also true). There is a large body of evidence indicating that this is the case among populations of deer (McCullough 1979, Clutton-Brock *et al.* 1982).

The Department uses two stock-recruitment computer simulation models (POPMODBT and KILLVARY) (Smith and Updike, in preparation) to analyze harvest alternatives. For a description of the KILLVARY model and its assumptions see Appendix 5 in the ED.

POPMODBT was developed by Dr. Reginald Barrett, University of California, Berkeley, for the purpose of teaching students the response of deer populations to harvesting. The model also allows the user to vary the carrying capacity of the range to reflect real-world conditions. POPMODBT is difficult to adapt to different

areas of the State, because many years of simulation are necessary to stabilize the model at observed herd composition ratios and harvest rates.

KILLVARY was developed by the Department for the purpose of analyzing deer harvest alternatives (see Appendix 5 in the ED). The model allows the user to vary carrying capacity to reflect real-world changes. It is easily adapted to all herd situations, because filed data are primary inputs. The KILLVARY model allows analysis of multiple harvest alternatives simultaneously. The KILLVARY model assumes the following:

1. The number of deer in the herd is regulated by the availability of good forage. If more good quality forage were made available by burning, planting, etc., the number of deer would increase. In other words, the population size is limited by the range carrying capacity.
2. Adult females have the potential to reproduce at 18 months of age. This fact has been shown in a variety of studies in California and other western states.
3. Fawns which survive to one year old and are about to be considered adults are half female and half male. Although information suggests that the proportion of buck fawns at birth increases as the herd approaches the range carrying capacity, the higher buck fawn mortality rate brings the proportion of buck to doe fawns down to a 50:50 ration at one year of age.
4. Nonhunting adult mortality is not sexually selective. In other words, mortality from causes other than hunting is no more intense for does than it is for bucks.
5. Hunting mortality occurs after nonhunting mortality. The adult bucks or does are reduced in number by the nonhunting mortality factor, and then hunter harvest removes additional animals.

The input variables for the model are herd composition ratios and deer harvest numbers. These variables are described below and are shown in Table 1-1 of the ED.

1. Buck Ratio – The current proportion of bucks in the herd. This value is usually reported as number of bucks per 100 does.
2. Spring fawn Ratio – The current proportion of fawns in the herd during the early spring. This ratio, usually reported as the number of fawns per 100 does, represents the recruitment of young into adult age classes.
3. Maximum Spring Fawn Ratio – The historically highest or potential proportion of fawns in the herd during the early spring. This ratio, usually reported as the number of fawns per 100 does, represents the recruitment of young into adult age classes. This value is used by the model to limit the recruitment of young to a realistic level. Fawns will not be allowed to enter the adult age classes at rates exceeding this value.

4. Harvest – This is the reported and unreported harvest of bucks and does during the hunting season

The results of the KILLVARY model include estimates of population size, percent of the herd lost to hunting and nonhunting mortality and herd composition ratios as a result of the input variables. In Chapters 4 and 5 of the ED, the KILLVARY model is used extensively to analyze the effects of the proposed project and alternatives to the proposed project. The effects of the alternatives in Chapter 5 of the ED are shown graphically in terms of harvest, buck ration and population size.

Ad Hoc Methods When Data are Lacking

Unfortunately, composition data are unavailable for a small number of deer herds in California. In some cases, the habitat is not suitable or accessible for surveys, and in other cases, personnel has been lacking. For herds subject to this restriction, the primary data available are the annual hunter harvest figures. Unfortunately, there is no way to make a reliable estimate of population size in these cases. Nevertheless, a possible range of herd sized can be estimated, based on harvest rates. The assumption is made that the harvest rate is the maximum feasible for the herd (giving consideration to the topography of the herd range and the number of tag sales, etc.).

If this maximum figure is applied to the hunter harvest figure, it gives a minimum population size estimate. For example, if five percent of a herd is harvested annually and 100 deer are killed, then there are 2,000 deer in the prehunt population and 1,900 post-hunt. The same can be done with a minimum feasible harvest rate, giving a maximum population size estimate. These estimates, then become the boundaries for a range of population size possibilities, within which the population size is likely to lie. The method provides realistic "sideboard' to assist in making evaluations of management activities.

A second approach requires an estimate of the percentage of legal bucks that are removed annually, as well as an estimate of the percentage of all bucks that carry legal antlers. Moreover, it requires that there be fall herd composition data available. With these three pieces of information and the hunter harvest figures, one can estimate population size. Unfortunately, the input to this model can be very subjective.

The buck harvest is decided by the proportion of legal bucks removed annually, then by the proportion of all bucks that carry legal antlers, giving an estimate of the size of the buck segment of the herd. This can then be used with fall herd composition data to calculate the size of the doe and fawn segments. The three estimates are then added together to give total population size. It is not possible to statistically evaluate this method. Therefore, it is not commonly used by the Department.

Reference Location	Deer Herd Management Plans	Deer Hunt Zones	Area-Specific Archery Hunts	Additional Hunts
Kern County Library 701 Truxtun Avenue Bakersfield, CA 93301	Avenal Greenhorn Kern River Monache Piute Santa Barbara/Ventura South Sierra Foothill Tejon	A,D8,D9,D10,D13, D17,X10	A19	G6,G38
Kings County Library 401 N. Douty Street Hanford, CA 93230	Avenal	A		
Lake County Library 1425 N. High Street Lakeport, CA 95453	Clear Lake Mendocino	A,B1,B3		M11
Lassen County Free Library Courthouse Annex S. Roop Street Susanville, CA 96130	Adin Doyle East Lassen East Tehama McCloud Flats Warner Mountains West Lassen	C4,X1,X3a,X3b,X4, X5a,X5b,X6a,X6b, X7a	A1,A3,A5,A6,A7, A8,A9,A11,A12, A13,A26	G1,M3,M4,M5,M8, J19
Los Angeles County Public Library 7400 E. Imperial Highway Downey, CA 90241	Los Angeles Santa Ana Mountains Santa Barbara/Ventura Tejon	A,D10,D11,D13, D15,D17	A31,A32	J13
Madera County Library 121 N. G Street Madera, CA 93637	Avenal Oakhurst San Joaquin South Sierra Foothill Yosemite	A,D7,X9a	A16	

Reference Location	Deer Herd Management Plans	Deer Hunt Zones	Area-Specific Archery Hunts	Additional Hunts
Marin County Free Library Civic Center San Rafael, CA 94903-4188	Santa Rosa	A		
Mariposa County Library 5119 Jessie Street Mariposa, CA 95338	Mother Lode Oakhurst Yosemite	D6,D7	A21	G37,J15
Mendocino County Library 105 N. Main Street Ukiah, CA 95482-4482	Clear Lake Mendocino	A,B1,B3,B5	A30	M11
Merced County Library 2100 O Street Merced, CA 95340-3790	Mother Lode Pacheco-Merced Pacheco-Stanislaus	A,D6		
Modoc County Library 212 W. Third Street Alturas, CA 96101-3913	Adin Devil's Garden/Interstate McCloud Flats Warner Mountains West Lassen	X1,X2,X3a,X3b	A3,A4,A5,A6,A27	M9
Mono County Free Library School & Emigrant Street Bridgeport, CA 93517-0398	Casa Diablo East Walker Mono Lake Sherwin Grade West Walker	X9a,X9c,X10	A16,A18,A20	G39, J12
Monterey County Library 26 Central Avenue Salinas, CA 93901	San Benito Santa Lucia	A	A24	G8,G21,J10
Napa City-County Library 1150 Division Street Napa, CA 94559-3396	Monticello	A		

Reference Location	Deer Herd Management Plans	Deer Hunt Zones	Area-Specific Archery Hunts	Additional Hunts
Nevada County Library 211 N. Pine Street Nevada City, CA 95959-2592	Downieville/Nevada City Loyalton/Truckee	D3,D4,X7a,X7b	A13,A14	J16,J17,J19,J20
Orange County Public Library 431 City Drive South Orange, CA 92668	Santa Ana Mountains	D15		
(Placer County) Auburn-Placer County Library 350 Nevada Street Auburn, CA 95603	Blue Canyon	D3,D4,X7b	A14	J16,J17,J20
Plumas County Library 445 Jackson Quincy, CA 95971	Bucks Mountain/Mooretown Downieville/Nevada City Doyle East Tehama Loyalton/Truckee Mother Lode Sloat	C4,D3,X6a,X6b,X7a	A1,A11,A12,A13	G1,G23,J16,J19
Riverside City & County Public Library 3581 Seventh Street Riverside, CA 92502-0468	Burro San Bernardino Mountains San Jacinto/Santa Rosa Mtns Santa Ana Mountains	D12,D14,D15,D19		J14
Sacramento Public Library 536 Downtown Plaza Mall Sacramento, CA 95814	Mother Lode	A,D4,D5		J17,J18
San Benito County Free Library 470 Fifth Street Hollister, CA 95023	San Benito	A		

Reference Location	Deer Herd Management Plans	Deer Hunt Zones	Area-Specific Archery Hunts	Additional Hunts
San Bernardino County Library 104 W. Fourth Street San Bernardino, CA 92415-0035	Burro Eastern Mojave Desert Los Angeles San Bernardino Mountains Santa Ana Mountains	D11,D12,D14,D15, D17		J11
San Diego County Library 5555 Overland Avenue, Building 15 San Diego, CA 92123-1296	San Diego Santa Ana Mountains	D15,D16,D19	A22	G10,G13,M6
San Francisco Public Library Civic Center 200 Larkin Street San Francisco, CA 94102	Santa Cruz	A (No Hunting Allowed By County/City Ordinance)	(No Hunting Allowed By County/City Ordinance)	(No Hunting Allowed By County/City Ordinance)
(San Joaquin Co.) Stockton-SanJoaquin County Public Library 605 N. El Dorado Street Stockton, CA 95202	Mother Lode Pacheco-Stanislaus	A,D5		J18
San Luis Obispo City-County Library 888 Morro Street San Luis Obispo, CA 93403-8107	Adelaida Pozo Shandon	A,D13		G9,MA1
San Mateo County Library 25 Tower Road Belmont, CA 94002-4297	Santa Cruz	A		
Santa Barbara Public Library 40 E. Anapamu Street Santa Barbara, CA 93102-1019	Pozo Mount Pinos Santa Barbara/Ventura	A,D13		G11,MA3
Santa Clara County Free Library 1095 N. Seventh Street San Jose, CA 95112-4434	Mount Hamilton Santa Cruz	A		

Reference Location	Deer Herd Management Plans	Deer Hunt Zones	Area-Specific Archery Hunts	Additional Hunts
Santa Cruz Public Library 224 Church Street Santa Cruz, CA 95060	Santa Cruz	A		
Shasta County Library 1855 Shasta Street Redding, CA 96001	Cow Creek East Tehama McCloud Flats Weaverville Yolla Bolly	B2,B5,C2,C3,C4, X1,X4	A1,A3,A7	G1,J4
Sierra County (No Public Libraries) - See Library Listings for Adjacent Counties: Butte, Lassen, Nevada, Plumas and Yuba	Bucks Mountain/Mooretown Downieville/Nevada City Loyalton/Truckee	D3,X7a,X7b	A13,A14	J16,J19,J20
Siskiyou County Public Library 719 Fourth Street Yreka, CA 96097-3381	Devil's Garden/Interstate Happy Camp Klamath McCloud Flats Redwood Creek	B1,B2,B6,C1,C2, X1,X2	A1,A3,A4	M11
Solano County Library 1150 Kentucky Street Fairfield, CA 94533	Capay/East Park Monticello	A		
Sonoma County Library Third & E Streets Santa Rosa, CA 95404-4479	Santa Rosa	A	A25	J1
Stanislaus County Free Library 1500 I Street Modesto, CA 95354-1166	Mother Lode Pacheco-Stanislaus	A,D5,D6		J18
Sutter County Library 750 Forbes Avenue Yuba City, CA 95991-3891	Mother Lode	D3,D4		G12,G19,J16,J17

Reference Location	Deer Herd Management Plans	Deer Hunt Zones	Area-Specific Archery Hunts	Additional Hunts
Tehama County Library 645 Madison Street Red Bluff, CA 96080-3383	East Tehama Hayfork Yolla Bolly	B2,B3,B5,C4	A1	G1, J3, J21
Trinity County Library 229 Main Street Weaverville, CA 96093	Hayfork Mad River Ruth Weaverville	B1,B2,B5		M11,J4
Tulare County Free Library 200 W. Oak Street Visalia, CA 93291-4993	Greenhorn Hume Kaweah Kern River Monache South Sierra Foothill Tule River	A,D7,D8,X10	A19	G6,G38
Tuolumne County Free Library 480 Greenly Road Sonora, CA 95370	Oakhurst Railroad Flat South Sierra Foothill Stanislaus Tuolumne Yosemite	D5,D6	A21	G37,J15
Ventura County Library Services Agency 651 E. Main Street Ventura, CA 93001-0771	Mount Pinos Santa Barbara/Ventura	A,D13	A32	M7
Yolo County Library 373 N. College Street Woodland, CA 95695-2767	Capay/East Park Mother Lode	A,D4		J17
Yuba County Library 303 Second Street Marysville, CA 95901	Bucks Mountain/Mooretown Downieville/Nevada City Mother Lode	D3,D4		G7,G19,J8,J16, J17

APPENDIX 9

List of Individuals and Organizations
Receiving
The 2004 Draft Environmental Document
Regarding Deer

List of Individuals and Organizations
Receiving the 2004 Draft Environmental Document
Regarding Deer Hunting

1. Mr. G. Lynn Sprague, U.S. Forest Service, Vallejo, California
2. Mr. Wayne White, U.S. Fish and Wildlife Service, Sacramento, California
3. Mr. Mike Pool, Bureau of Land Management, Sacramento, California
4. Mr. John Reynolds, National Park Service, San Francisco, California
5. Director, California Department of Parks and Recreation, Sacramento, California
6. Ms. Virginia Handley, The Fund for Animals, San Francisco, California
7. Ms. Lois Kliebe, Sportsmen's Council of Northern California, Redding, California
8. Ms. Kathy Lynch, Lynch and Associates, Sacramento, California
9. Mr. Gerald Upholt, California Rifle and Pistol Association, Sacramento, California
10. Mr. Keith Ringgenberg, Outdoor Sportsmen's Coalition, Fresno, California
11. Ms. Camilla Fox, Animal Protection Institute, Sacramento, California
12. Mr. Wayne Pacelle, Humane Society of the United States, Washington, DC
13. Mr. Patrick L. Smith, United State Department of Agriculture, Sacramento,California
14. Ms. Shannon Hebert, United State Department of Agriculture, Portland, Oregon
15. Mr. Alan Sanders, Sierra Club, Los Padres Chapter, Hueneme, California
13. Mr. Dan Heal, Sportsmen's Task Force, Chico, California
14. Mr. Dave Carter, Dixon, California
15. Modoc County Fish and Game Commission, Altura, California
16. Dr. J. Rod McGinnis, California Bowmen Hunters Sacramento, California
17. Mr. John Higley, Palo Cedro, California
18. Mr. Tony Pavone, El Granada, California
19. Mr. Rick Guidice, Los Gatos, California
20. Mr. Brian Kahn, Helena, Montana
21. Mr. Clark D. Frentzen, Walnut Creek, California
22. Mr. William Morrill, Mule Deer Foundation, Reno, Nevada
23. Mr. Bob Schaefer, Department of Fish and Game, Redding, California
24. Mr. Hunter Sein, Bureau of Land Management, North Palm Springs, California
25. Ms. Jan McKeever, Department of Fish and Game, Long Beach, California