DRAFT
ENVIRONMENTAL DOCUMENT

Section 364, 364.1, 555, and 601
Title 14, California Code of Regulations

Regarding

ELK HUNTING

SCH 2015082025

December 8, 2015

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF FISH AND WILDLIFE

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

LIST OF APPENDICES

CHAPTER 1. SUMMARY

The 2016 Elk Hunting Environmental Document is intended to support the actions of the Fish and Game Commission (Commission) as that body considers regulations pertinent to the conservation and recreational opportunities that may be presented to the Commission. These actions are consistent with the wildlife conservation policy adopted by the Legislature as set forth in Section 1801, Fish and Game Code (FGC). The State's wildlife conservation policy, among other things, contains an objective of providing hunting opportunities when such use is consistent with maintaining healthy wildlife populations.

Elk hunting regulations adopted by the Commission are set forth in Sections 364, 364.1, and 555, Title 14, California Code of Regulations (CCR), and enforced by the Department of Fish and Wildlife (Department). These regulations are authorized under the following statutes:

Section 203, FGC, authorizes the Commission to regulate game mammals in the state.

Section 203.1, FGC, requires the Commission to consider populations, habitat, food supplies, the welfare of individual animals, and other pertinent facts when adopting hunting regulations for elk.

Section 207, FGC, requires the Commission to hold public meetings when considering mammal hunting regulations and to hear the recommendations of the Department, other agencies, and the public.

Section 332, FGC, provides that the Commission may determine and fix the area or areas, the seasons and hours, the bag and possession limit, and the number of elk that may be taken under rules and regulations that the commission may adopt from time to time.

Sections 3950 -3952, FGC, designates elk (genus *Cervus*) as a game mammal in California; authorizes the Commission to regulate take of elk; and requires the Department to prepare an elk management plan.

The 2016 Elk Hunting Environmental Document sets forth the findings of the Department and recommendations for regulatory changes.

PROPOSED PROJECT AND ALTERNATIVES

The project discussed in this document (proposed project) involves modifications to the current elk hunting regulations for the 2016-2017 elk hunting season and subsequent seasons until a new environmental document is prepared and certified. Specifically, the

Department is proposing to modify annual tag quotas, establish 9 new hunt zones, and modify hunt boundaries, season dates, and hunt periods for various existing hunts.

The Department is also providing the Commission with a range of alternatives to the proposed project that could feasibly attain the basic objectives of the project. It is anticipated that the proposed project will fall near or below the median of the proposed tag ranges in most zones. Alternative 1 (no change) would maintain the existing analyzed harvest for each hunt zone without change. Alternative 2 (increased harvest) involves harvesting elk at approximately 50% above the proposed project. Alternative 3 (reduced harvest) involves harvesting approximately 50 % fewer elk than the proposed project. Alternative 4 (herd growth) proposes a harvest level if the elk populations increased within the zones. Population growth for elk zones were estimated based on the potential for those herds to increase in time. Growth estimates ranged from 18% to 400% depending on the zone. The time frame to reach the herd growth level for the analyzed population under this alternative will vary by herd. This is an alternative harvest that could be utilized within the life span of this environmental document. Current and proposed harvest strategies, for most herds, allow for population growth through time.

SUMMARY OF IMPACTS AND MITIGATION

Table 1 summarizes Department findings that there are no significant long-term adverse impacts associated with the proposed project or any of the project alternatives considered for the 2016 elk hunting regulations.

Table 1. Impact Summary

Alternative	Significant Impact	Nature of Impact	Mitigation Available	Nature of Mitigation
(Proposed Project)	No	None	N/A	N/A
1. No Change	No	None	N/A	N/A
2. Increased Harvest (+50%)	No	Some population levels may temporarily be reduced	N/A	Reducing hunting opportunity in future years
3. Reduced Harvest (-50%)	No	None	N/A	N/A
4. Herd Growth	No	None	N/A	N/A

It is anticipated that the number of tags issued will fall near or below the median from the proposed ranges (Appendix 2). The resulting harvest for 2016 will likely be lower

than the proposed tag median because hunter success has historically been less than 100 percent and hunts with multiple periods may have low number of tags issued or not have tags issued in every period every year. Based on success rates from previous years, the Department expects that the actual harvest will range from 55-80 percent of the elk tags allocated for 2016 (1990-present, Department of Fish and Wildlife data on file in the Wildlife Branch, Sacramento, California).

AREAS OF CONTROVERSY

A Notice of Preparation (NOP) for the proposed project was prepared and circulated on August 17, 2015. The NOP included the Initial Study which provided a project description, a preliminary, relatively brief environmental impact analysis for the proposed project, and information regarding a public scoping meeting to be held on August 26, 2015. This started a 30-day scoping period, which ended on September 15, 2015. A public scoping meeting was held on August 26, 2015 in Sacramento, CA.

The Department noticed stakeholders about the NOP, scoping period, and scheduled scoping meeting through the following methods:

- Posting in the State Clearinghouse
- Posting Initial Study and meeting notification on CDFW's public notice website
- Email meeting notification to members of the Big Game Management Advisory Committee dated August 14, 2015

The Notice of Preparation, initial study, preliminary impact assessment, summary of the issues identified at the scoping meeting, and written comments received during the 30-day scoping period are located in Appendix 3.

ISSUES TO BE RESOLVED

As provided by existing law, the Commission is the decision-making body (lead agency) considering the proposed project, while the Department has responsibility for management activities, such as hunting, translocating elk to suitable historic range, and preparing management plans. The primary issue for the Commission to resolve is whether to change elk hunting regulations as an element of elk management. If such changes are authorized, the Commission will specify the areas, seasons, methods of take, bag and possession limit, number of elk to be taken, and other appropriate special conditions.

FUNCTIONAL EQUIVALANCY

California Environmental Quality Act (CEQA) review of the proposed project will be conducted in accordance with the Commission's certified regulatory program (CRP) approved by the Secretary for the California Resources Agency pursuant to Public Resources Code section 21080.5 (See generally Cal. Code Regs., tit. 14, §§ 781.5, and

15251, subd. (b).). CEQA requires all public agencies in the State to evaluate the environmental impacts of projects they approve, including regulations, which may have a potential to significantly affect the environment. The Department has prepared this Environmental Document (ED), which is the functional equivalent of an Environmental Impact Report, on behalf of the Commission in compliance with this requirement. The ED provides the Commission, other agencies, and the general public with an objective assessment of the potential effects.

CHAPTER 2. THE PROPOSED ACTION

The proposed project being considered consists of the following modifications to existing elk hunting regulations:

1. Tag Ranges

In order to maintain hunting quality in accordance with management goals and objectives, it is periodically necessary to adjust quotas in response to dynamic environmental and biological conditions. This proposed project adjusts elk tag ranges to account for fluctuations in population numbers and hunting pressure (Appendix 2).

Elk Pop (Smith and Updike 1987) is a microcomputer-based model which was developed by the Department for the purpose of analyzing harvest alternatives. Elk Pop was used to assess effects of the proposed project (and project alternatives) on the specific Roosevelt, Rocky Mountain, and tule elk herds where hunting is proposed. The model allows the user to vary carrying capacity to reflect real-world changes in habitat capability. Population age and sex ratios (observed and estimated) are primary inputs to the model. Elk Pop allows analysis of multiple harvest alternatives simultaneously and is easily adapted to most herd situations.

Elk Pop utilizes data on age and sex composition of the herd, maximum calf survival, estimated population numbers, nonhunting mortality, and hunting mortality. Age and sex composition and maximum calf survival figures used in the model are based on observed and estimated rates. Population level and nonhunting mortality rates were estimated. Estimates of nonhunting mortality rates were considered valid representations of actual nonhunting mortality rates when the model predicted the observed herd composition ratios for 10 consecutive years. Effects of various harvest scenarios were then predicted on the basis of composition ratios and estimated nonhunting mortality rates. The computer model runs for various harvest scenarios (proposed project and the alternatives) for each elk zone where hunting is proposed can be found in Appendix 4.

2. Establish New Hunts:

a. Split existing Northwestern Roosevelt elk hunt into two separate zones within Del Norte, Humboldt, and Trinity counties (Del Norte and Humboldt Roosevelt elk hunts) and modify season framework.

Public opportunity to hunt elk in Del Norte, Humboldt, and Trinity counties currently exists. The proposal would establish two zones within Del Norte, Humboldt, and Trinity counties and adjust tag ranges and season dates. These zones will be created by splitting the Northwestern Roosevelt Elk Hunt zone into two zones (Del Norte and Humboldt Roosevelt elk zones – Appendix 5) and minor boundary adjustments for clarification. The establishment of these zones will allow the Department to distribute

hunting pressure to address landowner concerns over elk damage and increase opportunity while providing a biologically appropriate harvest within each zone. Bull (0-20), antlerless (0-50), and either-sex (0-10) tags would be available to the public during five hunt periods. Each hunt period would begin on the first of the month for September, October, November, December, and January and extend for 20 consecutive days.

b. Split existing Marble Mountains Roosevelt elk hunt into two separate zones within Humboldt, Shasta, Siskiyou, and Trinity counties (Marble Mountain North and Marble Mountain South Roosevelt elk hunts) and modify season framework.

Public opportunity to hunt elk in Humboldt, Shasta, Siskiyou, and Trinity counties currently exists. The proposal would establish two zones within Humboldt, Shasta, Siskiyou, and Trinity counties. In addition it would make minor boundary adjustments, modify seasonal framework, and adjust tag ranges. These zones will be created by splitting the Marble Mountain Roosevelt elk zone into two zones (Marble Mountain North and Marble Mountain South – Appendix 6). The establishment of these zones will allow the Department to distribute hunting pressure in relation to elk distribution, increase opportunity, and obtain an appropriate harvest level. As part of these modifications hunting periods will be divided into early season archery/muzzleloader either-sex (0-20); period 1 bull (0-50), antlerless (0-20), and either-sex apprentice (0-4); period 2 bull (0-10) and antlerless (0-40); period 3 bull (0-5) and antlerless (0-15) tags would be available to the public during the hunt periods in each zone. Early season archery/muzzleloader shall open on the last Wednesday in August and continue for 9 consecutive days. Period 1 would open on second Saturday in September and continue for 12 consecutive days. Period 2 shall open on the last Saturday in September and continue for 12 consecutive days. Period 3 shall open on the first Wednesday in November and continue for 16 consecutive days.

c. Split and expand the existing Mendocino tule elk hunt into five elk hunts within Mendocino County. (Mendocino North Coast, Mendocino Middle Fork, Mendocino Upper Russian River, Mendocino Little Lake, and Mendocino South Coast elk hunts).

Public opportunities to hunt elk are limited in Mendocino County. The proposal would establish five zones within Mendocino County (splitting the current Mendocino elk hunt zone and extending the boundaries (Mendocino North Coast, Mendocino Middle Fork, Mendocino Upper Russian River, Mendocino Little Lake, and Mendocino South Coast elk hunt zones – Appendix 7). Sufficient numbers of elk occur within the proposed hunt boundary to provide opportunity for the public to hunt elk. The establishment of these zones will allow the Department to distribute hunting pressure to address landowner concerns over elk damage and increase hunter opportunity while providing a biologically appropriate harvest within each zone. Mendocino North Coast, bull (0-10) and antlerless (0-40); Mendocino Middle Fork, bull (0-10) and antlerless (0-40); Mendocino Upper Russian River, bull (0-10) and antlerless (0-40); Mendocino Little Lake, bull (range 0-5) and antlerless (0-10), no tags to be issued under current conditions (establishing zone boundaries); Mendocino South Coast, bull (0-5), antlerless (0-10) tags would be

available to the public in each zone. The bull season shall open on the Wednesday preceding the third Saturday in August and continue for 10 consecutive days. The antlerless season shall open the first Saturday in November and continue for 10 consecutive days.

d. Split the Independence tule elk hunt in Inyo County into two zones, establishing a new tule elk zone (Goodale) in the Owens Valley.

In conjunction with zone boundary modifications for the Independence tule elk zone a new zone (Goodale – Appendix 8) will be created by dividing the Independence zone into two zones (Goodale and Independence). This zone is being established to efficiently distribute hunting pressure and manage harvest. Sufficient numbers of elk occur within the proposed hunt boundary to provide opportunity for the public to hunt elk. Creating a new hunt boundary (splitting the zone) allows the Department to more appropriately manage harvest. The proposal would add a new hunt (portion of existing Independence zone) in Inyo County. Bull (0-10) tags and antlerless tags (range 0-10) would be available to the public during the established seasons.

e. Establish new tule elk hunt in portions of Kern, San Luis Obispo, Santa Barbara, and Ventura Counties (San Emigdio Mountain tule elk hunt).

Public opportunities to hunt elk in Kern, San Luis Obispo, Santa Barbara, and Ventura Counties are limited or non-existent. Sufficient numbers of elk occur within the proposed hunt boundary to provide additional opportunity for the public to hunt elk. The proposal would add a (new) hunt for elk in Kern, San Luis Obispo, Santa Barbara, and Ventura Counties called San Emigdio Mountain tule elk hunt (Appendix 9). The establishment of this zone will allow the Department to address landowner concerns and increase opportunity while providing a biologically appropriate harvest. Bull (0-15) and antlerless (0-40) tags would be available to the public during a season beginning on the second Saturday in November and continuing for 14 consecutive days.

f. Establish new tule elk hunt in portions of Monterey and San Luis Obispo Counties (Camp Roberts tule elk hunt).

Public opportunities to hunt elk in Monterey and San Luis Obispo counties are limited. Sufficient numbers of elk occur within the proposed hunt boundary to provide additional opportunity for the public to hunt elk. The proposal would add a (new) hunt in Monterey and San Luis Obispo Counties called Camp Roberts tule elk hunt (Appendix 10). Bull (0-10) and antlerless (0-20) tags would be available to the public and military during each of the three hunt periods. The season for period one shall open on the third Saturday in September and continue for 16 consecutive days. The season for period two shall open on the second Saturday in November and continue for 16 consecutive days. The season for period three shall open 16 days prior to January 2 and continue for 16 consecutive days.

3. Modify Existing Hunt Boundaries:

a. La Panza tule elk hunt boundary modification.

Existing regulations specify boundaries for the La Panza tule elk hunt. In conjunction with modifications to the Fort Hunter Liggett boundary the La Panza boundary will also be modified (Appendix 11). A portion of the area previously within the La Panza zone north of highway 198 will now be within the Fort Hunter Liggett Central Coast tule elk zone. This is in an effort to better distribute harvest within these zones, increase opportunity, and address landowner concerns. The La Panza season framework will remain as previously identified.

b. Grizzly Island tule elk hunt boundary modification.

Existing regulations specify boundaries for the Grizzly Island tule elk hunt. During the last several years elk population numbers have increased and their range has expanded beyond existing hunt boundaries. The modifications will expand the boundary to outside of the Grizzly Island Wildlife Area (Appendix 12). The proposal to expand boundaries for the Grizzly Island tule elk hunt is necessary to improve hunter opportunity and implement an appropriate harvest level.

c. Fort Hunter Liggett tule elk hunt boundary modification.

Public opportunities to hunt elk in Monterey and San Benito counties are limited to the lands within the confines of Fort Hunter Liggett Military base and a portion of the La Panza and San Luis Reservoir tule elk zones. Tule elk populations have increased and their range has expanded beyond existing hunt boundaries. The proposal expands boundaries for the Fort Hunter Liggett tule elk hunt to encompass portions of Monterey, San Benito, and San Luis Obispo counties. The new hunt zone will be called the Fort Hunter Liggett Central Coast tule elk hunt (Appendix 13). (Note: the new hunt boundary does not change how public and military hunts are conducted within the military base itself.) In conjunction with modifications to the La Panza zone, a portion of the expanded hunt zone will encompasses the northern portion of the previously established La Panza tule elk zone north of highway 198 to the boundary of the San Luis Reservoir tule elk zone. This is in an effort to improve hunter opportunity, address expanding elk populations, and respond to landowner concerns. These modifications will result in an appropriate harvest level.

4. Modify Season Dates, Hunt Periods, and Tag Ranges:

a. Siskiyou Roosevelt elk hunt.

Public opportunity to hunt elk in Siskiyou County currently exists. The recommended changes will increase opportunity and address private property conflicts through the establishment of primitive weapon, apprentice, and additional hunt periods while

maintaining an appropriate harvest level. As part of these modifications hunting periods will be divided into early season archery/muzzleloader either-sex (0-20); period 1 bull (0-40), antlerless (0-40), apprentice either-sex (0-2); period 2 bull (0-10) and antlerless (0-40); period 3 bull (0-5) and antlerless (0-20) tags would be available to the public during the hunt periods in each zone. Early season archery/muzzleloader would open on the last Wednesday in August and continue for 9 consecutive days. Period 1 would open on second Saturday in September and continue for 12 consecutive days. Period 2 would open on the last Saturday in September and continue for 12 consecutive days. Period 3 would open on the first Wednesday in November and continue for 16 consecutive days.

b. Northeastern Rocky Mountain elk hunt.

The proposal modifies the season dates for the bull and antlerless tags in the Northeastern Rocky Mountain elk hunt zone. This is an effort to distribute hunter pressure for this zone. This change will modify the hunt dates for the antlerless tag to begin separately from the bull season. Currently the Northeastern Rocky Mountain elk hunt has authorized tag ranges for antlerless (0-10) and archery only either-sex (0-20). In an effort to manage at an appropriate harvest level and provide additional opportunity the proposal would modify tag ranges for antlerless (e 0-20), add archery only bull (0-10), and archery only antlerless (0-10) tags The bull season shall open on September 19 and continue for 12 consecutive days. The antlerless season shall open on the second Saturday in November and continue for 12 consecutive days.

c. Cache Creek tule elk hunt.

Currently the Cache Creek tule elk hunt has authorized tag ranges for bull (0-4) and antlerless (0-4) tags. In an effort to manage at an appropriate harvest level and allow additional future opportunity to hunters the proposal would modify tag ranges for bull (0-10) and antlerless (0-10) tags.

d. La Panza Tule Elk Hunt.

Currently the La Panza elk tule elk hunt has authorized tag ranges for bull (0-12 Periods 1 and 2) and antlerless (0-10 Period 1 and 0-12 Period 2) tags. In an effort to manage at an appropriate harvest level, allow additional future opportunity to hunters, and address landowner concerns, the proposal would modify tag ranges for bull (0-20 Period 1 and 2) and antlerless (0-30 Period 1 and 2) tags.

e. Grizzly Island Tule Elk Hunt.

The Grizzly Island tule elk population has substantially increased over the last several years. The proposal modifies the seasonal framework, adds additional hunt periods, and modifies tag ranges. This is in an effort to safely distribute hunting pressure while maintaining an appropriate level of harvest. Currently there are five hunt periods

consisting of four days each, bull (0-3 during periods 1-3 and 0-2 during periods 4-5), antlerless (0-12 during all periods), and spike (0-6 during all periods). The proposal modifies tag ranges for bull (0-3), antlerless (0-12), and spike (0-10) for each of the proposed 13 periods.

f. Fort Hunter Liggett Central Coast tule elk hunt.

As part of the overall modifications to the Fort Hunter Liggett tule elk hunt zone. This proposal modifies season dates for the Fort Hunter Liggett tule elk hunts, adjusts tag quotas, and identifies the name change to Fort Hunter Liggett Central Coast tule elk hunt. Due to military use constraints, hunt dates on the base are subject to change from year to year. This is part of an effort to increase hunter opportunity and success while achieving an appropriate harvest level. The following season dates apply to both civilian and military tags (military tags are only valid on Fort Hunter Liggett military base). The archery only either-sex hunt shall open on the last Wednesday in July and continue for 9 consecutive days (0-6). The archery antlerless hunt shall open on the last Wednesday in September and continue for 9 consecutive days (0-10). Period 1 bull (range 0-14) and antlerless (0-16) shall open on the first Thursday in November and continue for 9 consecutive days. Period 2 bull (0-14) and antlerless (range 0-16) shall open November 22 and continue for 9 consecutive days. Period 3 bull (0-14), antlerless (0-14), apprentice bull (0-2) and apprentice antlerless (0-8) hunt shall open on the third Saturday in December and continue for 16 consecutive days. The muzzleloader bull (0-10) and antlerless (0-6) shall open on the second Saturday in October and continue for 12 consecutive days. Early season military only hunt bull (0-2) and antlerless (0-2) shall open on August 22 and continue for 5 consecutive days.

g. San Luis Reservoir tule elk hunt.

Tule elk numbers have significantly increased within the San Luis Reservoir zone. The proposal modifies the season dates for the San Luis Reservoir tule elk hunt zone, establishes three separate hunt periods, and modifies tag ranges. This is an effort to distribute hunter pressure over time, reduce potential crowding in popular hunt areas, provide additional opportunities for hunters, and achieve an appropriate harvest level. Currently San Luis Reservoir elk hunt has authorized tag ranges for bull (0-10), antlerless (0-10), and either-sex (0-10). The proposal would establish three separate hunt periods, bull (0-10), antlerless (0-20), and either-sex (0-10) tags for each period. The season for period 1 shall begin on the first Saturday in October and continue for 23 consecutive days. The season for period 2 shall begin on the second Saturday in November and continue for 12 consecutive days. The season for period 3 shall begin on the third Saturday in December and continue for 12 consecutive days.

h. Bear Valley tule elk hunt.

Currently the Bear Valley tule elk hunt has authorized tag ranges for bull (0-4) and antlerless (0-2) tags. In an effort to manage at an appropriate harvest level, address

landowner concerns, and allow additional future opportunity to hunters the proposal would modify tag ranges for bull (range 0-10) and antlerless (range 0-10) tags.

i. Lake Pillsbury tule elk hunt.

Tule elk numbers have increased within the Lake Pillsbury zone. The proposal modifies the season dates for the Lake Pillsbury tule elk hunt zone, establishes three separate hunt periods, and modifies tag ranges. This is an effort to distribute hunter pressure over time, reduce potential crowding in popular hunt areas, provide additional opportunities for hunters, and achieve an appropriate harvest level. Currently Lake Pillsbury elk hunt has authorized tag ranges for bull (0-4) and antlerless (range 0-4). The proposal would establish three separate hunt periods, bull (0-10) and antlerless (0-10) tags for each period. Period 1 shall open on the Monday following the fourth Saturday in September and continue for 10 consecutive days. The season for period 2 shall open on the second Wednesday in October and continue for 10 consecutive days. The season for period 3 shall open on the fourth Wednesday in October and continue for 10 consecutive days.

j. Santa Clara tule elk hunt.

Currently the Santa Clara tule elk hunt has authorized tag ranges for bull (0-4). In an effort to manage at an appropriate harvest level and allow additional future opportunity to hunters when appropriate the proposal would establish tag ranges for antlerless (0-20) tags and modify the bull tag range to 0-15.

k. Alameda tule elk hunt.

Currently the Alameda tule elk hunt has authorized tag ranges for bull (0-4). In an effort to manage at an appropriate harvest level and allow additional future opportunity to hunters when appropriate the proposal would establish tag ranges for antlerless (0-10) tags.

l. Cache Creek apprentice tule elk hunt.

Currently the Cache Creek apprentice tule elk hunt has authorized tag ranges for bull (0-4) tags. In an effort to manage at an appropriate harvest level and allow additional future opportunity to hunters the proposal would establish tag ranges for antlerless (0-2) tags.

m. Grizzly Island apprentice tule elk hunt.

Currently the Grizzly Island apprentice hunts have authorized tag ranges for period 1 antlerless (0-4), spike (0-4) and period 2 spike (0-4). In an effort to manage at an appropriate harvest level and allow additional future opportunity to hunters the proposal

would establish tag ranges for period 2 antlerless (0-4) tags, period 3 and 4 antlerless and spike (0-4) tags in addition to the established tag ranges for period 1.

n. Owens Valley multiple zone tule elk archery only hunt.

Currently tag holders can hunt in the Bishop, Independence, Lone Pine, Tinemaha Mountain, and Whitney zones. As part of the zone splitting of the Independence zone and to more effectively distribute hunting pressure the proposal would make the tag valid in the Bishop, Independence, and Lone Pine zones.

o. Multi-zone Fund Raising License Tag.

Current season dates for each of the zones this tag is valid in (Siskiyou, Marble Mountain, Northwestern, Northeastern, and La Panza) begin prior to the earliest season opening date within each zone. In conjunction with modifications (zone splitting) and the season frame work (additional hunt periods) within these zones and for consistency of seasonal framework the proposal establishes a single season for this tag which shall be valid across the zones. The season for all zones (Del Norte, Humboldt, Marble Mountain North, Marble Mountain South, Northeastern, and La Panza) shall open on the second Saturday in August and continue for 90 consecutive days.

The Department is recommending that the Commission adopt regulations that will provide for limited public hunting of Roosevelt, Rocky Mountain, and tule elk in 31 zones. The department is recommending tag allocations within the ranges listed in Appendix 2 for each hunt area with the following seasons: Archery only, muzzleloader only, general, apprentice, archery/muzzleloader only, military, SHARE, and fund raising hunts. Based on historic quotas from the past 5 years, the department expects that the tag quota for 2016 will fall near or below the median of the listed ranges. Additional hunt periods have been added to several hunts to provide the framework for yearly tag adjustments in response to elk movements and distribution. It is anticipated that tag issuance within hunt periods will fall below the median for most periods.

Three of the bull elk license tags shall be made available for fund-raising purposes, as authorized pursuant to subsection 332(d), FGC. These tags will be sold pursuant to a regulation adopted by the Commission. In addition, up to 55 Cooperative Elk Hunting tags would be available (directly correlated with the number of general elk tags issued for each hunt). Hunting under authority of the PLM Program would continue and not more than 115 antlerless and 140 bull tags would be recommended under the PLM Program.

One element of the proposed project provides archery only elk hunt periods at specified locations. The proposed project provides archery only tags each for Fort Hunter Liggett Central Coast tule elk hunt, Northeastern California Rocky Mountain elk hunt, and tule elk hunts within the Owens Valley. Hunt periods exclusively for archers are designated at each location.

Another element of the proposed project provides muzzleloader only elk hunt periods at specified locations. The proposed project provides muzzleloader only tags for Fort Hunter Liggett Central Coast, and hunts within the Owens Valley tule elk hunts.

An additional element of the proposed project provides archery/muzzleloader only hunt periods at a specified location. The proposed project provides combination archery and muzzleloader only tags for the Marble Mountain (North and South) and the Siskiyou Roosevelt elk hunts.

BACKGROUND AND EXISTING CONDITIONS

THE MANAGEMENT OF ELK IN CALIFORNIA

There are three subspecies of elk in California: Roosevelt, Rocky Mountain, and tule elk. Roosevelt elk occupied the Cascade and Coast mountain ranges as far south as San Francisco (Harper et al. 1967), and eastward at least to Mount Shasta (Murie 1951). Tule elk were distributed throughout the Central, Sacramento and San Joaquin valleys and the grasslands and woodlands of central California's Coast Range (McCullough 1969). Although there appears to be disagreement regarding their subspecific status, both Murie (1951) and McCullough (1969) included portions of Shasta, Siskiyou and Modoc counties in northeastern California within the historical range of Rocky Mountain elk. Further clarification of the historical and current subspecific status of elk in northeastern California is unlikely because of the translocation of Rocky Mountain elk to the Pit River area in the early 1900s. However, predictions of genetic flow across the landscape supported by the journal entries of early American explorers suggest that elk have been endemic to northeastern California for thousands of years. Locations where historical specimens of Rocky Mountain elk have been recovered have helped scientists map the probable routes taken by these highly mobile ungulates as they populated North America (McCullough 1969).

Because of their large body size and the availability of smaller prey, it is unlikely that Native Americans had a significant impact on elk populations in California. Early explorers also had little direct impact on elk populations. Apparently they preferred domestic livestock to elk (McCullough 1969). However, these early explorers were responsible for the introduction of exotic annual grasses and domestic livestock, both of which had long-term, deleterious impacts on California's elk populations. Livestock competed directly with elk for forage and contributed to the conversion of the native perennial grasslands to annual grasslands, which resulted in the loss of important forage plants used by elk during the summer and fall months.

Historical Perspective of Roosevelt Elk Management

Although once widely distributed throughout northern California, by the late 1800s, Roosevelt elk were extirpated throughout much of their historic California range.

Barnes (1925a, 1925b) reported that by 1925, Roosevelt elk range in California was reduced to one small area in Humboldt and Del Norte counties. Mining, logging, agriculture, and market shooting were factors that contributed to the decimation of Roosevelt elk in much of California. Because of their large body size and herding behavior, elk were vulnerable to market shooting. Harper et al. (1967) discussed the historical distribution of Roosevelt elk in California and reported that by 1967 the population was increasing in size and in no danger of extinction.

Based on the current distribution of Roosevelt elk in California (Appendix 14), population growth and range expansion has continued since 1967. Public ownership (USFS and BLM) of large tracts of Roosevelt elk habitat and the associated Congressional mandates and directions to provide for and maintain wildlife habitats have resulted in significant Roosevelt elk population increases during the 20th century. Roosevelt elk herds in California are now healthy and viable. Populations of Roosevelt elk currently exist in the coastal areas of Mendocino, Humboldt, and Del Norte counties, in addition to the Cascade and Klamath mountain ranges in Siskiyou and Trinity counties. Some of these populations were established when the Department (in cooperation with other State and Federal agencies) relocated elk to suitable historic range. Other populations were established when elk moved into California from Oregon. Additionally, new populations have become established through the dispersal of elk from existing populations to adjacent suitable areas. The Department currently estimates the statewide Roosevelt elk population at between 5,000-6,000 individuals. This estimate is based on field observations and professional judgment and experience obtained in studying elk throughout California, the Department has determined that this estimate of total population size is reasonable.

Tule elk generally exist in open habitat types and can be captured in large numbers (40 or more at a time) by herding them into large corral type traps with the aid of a helicopter. On the other hand, Roosevelt elk use forested habitat types, where they are often impossible to see from a helicopter because of the dense forest canopy. For this reason, helicopter-assisted capturing of Roosevelt elk is generally not effective in California. Nevertheless, successful Roosevelt elk translocations have occurred when large groups have been captured in Redwood National Park or on winter range in Oregon. Since 1985, the Department has translocated more than 280 Roosevelt elk to reestablish populations in portions of southern Humboldt, Mendocino, Siskiyou, and Trinity counties.

Historical Perspective of Rocky Mountain Elk Management

There are currently three populations of Rocky Mountain elk in the State (Appendix 14), totaling approximately 1,500-2,000 animals. This estimate was developed using procedures similar to those used to estimate Roosevelt elk numbers.

One population of elk has become established in the Warner Mountains in Modoc County. This population was established by natural immigration of elk from

southeastern Oregon and/or northern California. Two populations of Rocky Mountain elk exist in the southern part of the State. One population in southwestern Monterey and northwestern San Luis Obispo counties occurs on the Los Padres National Forest and the surrounding private lands. Another Rocky Mountain elk population exists in southern Kern County. Based on periodic ground and aerial surveys conducted by the Department, there are approximately 300-500 elk in these two southern populations, which were established through translocation efforts. The population of Rocky Mountain elk proposed for regulated public hunting is scattered throughout portions of Lassen, Modoc, Shasta and Siskiyou counties. A portion of this population was established in 1913 by the Redding Elks Club. Fifty elk were loaded on boxcars in Gardiner, Montana (near Yellowstone National Park), and released at the Bully Hill Mine in Shasta County. During subsequent years, animals dispersed from the release site (and from other locations in southeastern Oregon) to scattered locations throughout northeastern California.

Historical Perspective of Tule Elk Management

Although smaller than Roosevelt elk, the tule elk is one of the largest land mammals endemic to California. Tule elk likely evolved from Rocky Mountain elk in California during the Pleistocene (McCullough 1969). Tule elk made a lasting impression on the first Europeans to arrive in California. Accounts in journals and diaries of these early explorers indicate that approximately 500,000 tule elk inhabited much of the oak-woodland and oak-grassland habitat types in the State (McCullough 1969). Appendix 15 depicts historic tule elk range.

The discovery of gold at Sutter's Mill in 1848 brought about the greatest impact on the tule elk population, both in terms of immediate reduction of total elk numbers and permanent loss of habitat. The large influx of people into California during the gold rush era resulted in tremendous pressures placed on the State's wildlife resources. People needed clothing and food, which could be obtained from elk. Market hunters soon eliminated tule elk from large accessible areas of their range. The elk's large size, coupled with their social behavior (herding), increased their vulnerability to market shooting (McCullough 1969). However, more important than market hunting, competition with livestock, or the conversion of perennial grasslands to annual grasslands, was the conversion of large amounts of tule elk habitat to agricultural land uses. By the late 1860s, tule elk were extirpated from all but one small locale in the southern San Joaquin Valley (McCullough 1969).

In 1874, while draining a marsh on the Miller-Lux Cattle Ranch in what is now Kern County, workers observed a small group of tule elk. Henry Miller, an extremely wealthy and powerful landowner, ordered complete protection of tule elk on his land. This was to be the first in a series of cases where, under complete protection, tule elk numbers and distribution expanded, resulting in considerable damage to private property (Fowler 1985).

By the turn of the century, the elk on the Miller-Lux Ranch were causing extensive damage to fences, crops, and irrigated pasture. Miller requested the elk be relocated in an effort to reduce his damages. Over the next few years, the U.S. Biological Survey attempted to relocate tule elk via the "rodeo technique" (ropes and horseback). This technique did not provide positive results. In fact, the majority of the elk were killed during capture attempts or during transport to the release sites. A single relocation was considered partially successful when 21 elk were relocated to the Sequoia National Park. However, they died out by 1926 (McCullough 1969).

McCullough (1969) stated that by 1914 tule elk were causing $5,000-$10,000 damage per year on the Miller-Lux Ranch. At this time, the California Academy of Science took over the tule elk relocation effort. The Academy was much more successful in capturing tule elk because they baited elk into a corral trap instead of attempting to capture them from horseback. During the period from 1914 to 1934, the Academy relocated 235 tule elk to 22 different locations, including Cache Creek and the Owens Valley. As was the case with the earlier relocation attempts by the U.S. Biological Survey, the majority of the relocation projects were unsuccessful.

Tule elk at Cache Creek were allowed to expand their range and, until the summer of 1986, did not cause significant damage to private property. At the Tupman Tule Elk Reserve, elk were confined to a 953-acre enclosure, no mechanisms for population control were used, and the herd expanded to a point where the habitat was essentially destroyed and artificial feeding was necessary. This situation was greatly improved as a result of reducing the population by moving tule elk to other sites. In addition, the California Department of Parks and Recreation has undertaken numerous habitat improvement projects. In an effort to reduce damage to the improved habitat, the Department of Fish and Wildlife has held the herd size at 30-35 individuals by periodically relocating surplus elk.

In the Owens Valley, the Miller-Lux story repeated itself. Under total protection, elk numbers in the Valley increased rapidly, and local farmers and ranchers soon were experiencing serious depredation problems, including damage to fences, irrigation equipment, and alfalfa. In 1943, the Department attempted to provide depredation relief by recommending public hunting of tule elk in the Valley. From 1943 through 1969, the Commission approved a total of seven elk hunts. These hunts were not well received by farmers, who wanted all the elk removed, or animal preservationists, who objected to the rather drastic herd reductions.

By 1960, concern by tule elk preservationists resulted in the formation of the Committee for the Preservation of Tule Elk. The Committee and other interested groups opposed hunting of tule elk. After the adoption of the 1969 tule elk hunt by the Commission, the Committee for the Preservation of Tule Elk sought legislation to prohibit hunting of tule elk. In 1971, specific legislation (commonly referred to as the Behr Bill) was enacted into law. This law restricted the Commission's authority to authorize the take of tule elk until their statewide numbers exceeded 2,000 or until the Legislature determined that

there were insufficient areas available to accommodate such a number in a healthy state. It also required the Department to relocate elk to suitable areas and to report to the Legislature every two years on the status of the State's tule elk herds. Additionally, the legislation stated the Owens Valley elk population should not exceed 490 individuals.

Tule Elk Management (1971 through Present)

In 1971, Section 332, FGC, was amended to prohibit the Commission from authorizing the take of tule elk until the statewide population estimate exceeded 2,000 animals (Koch 1989). At that time, approximately 500 tule elk inhabited California. In 1971, upon amendment of Section 332, and addition of Section 3951, FGC, the Department was required to identify suitable relocation sites for a species which was known to wander great distances (over and through fences) and for its potential to damage agricultural crops. There were very few individuals or government agencies with suitable tule elk habitat which offered their lands for tule elk relocation.

In 1976, the United States Congress passed Public Law (PL) 94-389, which concurred with the amended California law in recognizing that the establishment of tule elk populations totaling 2,000 animals was an appropriate national goal and in setting the ceiling of 490 tule elk for the Owens Valley. More important, however, PL 94-389 required the secretaries of Defense, Agriculture, and the Interior to cooperate with the State in making suitable Federal lands reasonably available for tule elk. Additionally, in 1977, the Secretary of the Interior recommended to Congress that an Interagency Task Force be established to carry out the provisions of Federal and State legislation. At the direction of Congress, the Tule Elk Interagency Task Force was established in 1977.

The Management Plan for the Conservation of Tule Elk was completed by the Task Force in 1977 and revised in 1985. In the plan, the Task Force provided specific criteria to be met for an area to be considered a suitable tule elk release site. These criteria are based on sound biological principles, and take into account land-use practices and the laws and regulations of the State (Appendix 16).

Since its preparation, the Management Plan for the Conservation of Tule Elk has served as the foundation for the Department's tule elk management activities. Total protection after 1971, coupled with an aggressive reintroduction program in which over 1,170 tule elk have been moved to new areas of the State, resulted in a dramatic increase in the statewide tule elk population.

However, as in the past, this increase in elk numbers and occupied range has resulted in a situation where at least 12 of the State's tule elk herds have caused or are continuing to cause damage to private property. In response to the increasing level of tule elk damage to property occurring in the State, Assemblyman Hauser introduced legislation (AB 998) in 1987 which amended FGC sections 332 and 3951. Assembly Bill 998 was approved by the Legislature and signed by the Governor on September 27,

1987. As amended, Section 332 allows the Commission to authorize tule elk hunting if the average of the Department's statewide tule elk population estimate exceeds 2,000 animals. Section 3951 specified that the maximum number of tule elk in the Owens Valley should not exceed 490 individuals, and directed the Department to relocate tule elk to suitable areas within the State and report to the Legislature every two years on their status in California (the last report to the Legislature was submitted in October, 2000 and legislation in 2001 eliminated the reporting requirement). The statute also requires that, where economic or environmental damage occurs, emphasis shall be placed on managing each tule elk herd at biologically sound levels through the use of relocation, hunting, or other appropriate means determined by the Department.

Section 3951, FGC, also requires the Department to prepare management plans for "high priority areas, including, but not limited to Potter Valley and Mendocino County..." The Legislature only defined Potter Valley and Mendocino County as high-priority areas and left the responsibility of determining other high-priority areas to the Department. In addition to Potter Valley and Mendocino County, the Department identified Grizzly Island, La Panza, Cache Creek, Lone Pine, Tinemaha, and Bishop as other high-priority areas. Management plans for these and eight other areas have been completed and approved by the Department.

In 1987, the statewide tule elk population exceeded 2,000 animals and the Commission established regulations under which a limited number of tule elk would be hunted in 1988 (Fish and Game Commission, Statement of Purpose for Regulatory Action, January 11, 1988). However, in September 1988, a citizens group obtained a court order preventing implementation of the regulations, based primarily on a finding that the Commission's decision did not comply with CEQA. In 1989, the Department prepared an environmental document regarding tule elk hunting, which was circulated for review as provided for by CEQA. The Commission certified the environmental document and adopted regulations providing for the take of up to 95 tule elk from specific areas in the State (the Bishop and Lone Pine subherds and a portion of the herd at Cache Creek). Eighty-four elk were taken by hunters during the 1989 tule elk hunting season.

Since 1989 the Department has prepared the appropriate environmental documentation to continue to provide for public hunting of tule elk from specific populations. In 1990, Assemblyman Hauser introduced legislation which was passed by the Legislature and signed by the Governor (AB 2848), amending Section 332, FGC, to allow the Commission to authorize issuance of up to three elk tags for fund-raising purposes. All revenue generated by the "fund-raising" tags is to be used for elk management in California. Since 1990, the Commission has authorized public tule elk hunting at additional locations, including Alameda County, Glenn County, Grizzly Island, Fort Hunter Liggett, Fresno County, Kern County, Kings County, Lake County, Mendocino County, Merced County, Inyo County, Santa Clara County, and Stanislaus County.

The dramatic increase in numbers and distribution has provided a substantial increase in opportunities for viewing, photographing, and natural history study of tule elk.

Currently (October 2016), there are at least 5,100 tule elk in 22 separate herds throughout California (Appendix 14). Four herds (San Luis, Tupman, Point Reyes, and Grizzly Island) have formal interpretive programs where the public has the opportunity to view, photograph, and observe the natural history of tule elk with assistance provided by experienced State, Federal, or volunteer staff. A tule elk viewpoint along a major highway has been established for the Tinemaha subherd. There the public can view, photograph, and study the behavior of tule elk. Interpretive signs can also be found for the Cache Creek tule elk herd.

Additionally, major land acquisitions by the Department, The Nature Conservancy, and BLM in the La Panza Tule Elk Management Unit in San Luis Obispo County and in the Cache Creek Tule Elk Management Unit (Colusa, Lake, and Yolo counties) provide increased access to areas used by elk. The management plan for the La Panza Tule Elk Management Unit contains a specific element for developing formal interpretive programs. In addition to the herds which have established interpretive programs, approximately one-half of the State's tule elk exist on public lands where the public has opportunities to observe and photograph tule elk.

Existing conditions regarding elk hunting

Regulated public hunting for Roosevelt elk has occurred annually in California since 1986, whereas annual hunting for Rocky Mountain began in 1987. Public tule elk hunting has been authorized by the Commission annually since 1989. Although additional public hunts for Roosevelt, Rocky Mountain and tule elk have been established subsequent to 1986, annual elk hunting has been part of the existing conditions in California for the last 29 years. Appendix 17 lists the verbatim for the current condition of elk hunting in California.

PLM Hunts

The PLM Program was authorized by the Legislature 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 and other forms of recreation. Section 601, Title 14, CCR, contains regulations adopted by the Commission pertaining to the program, and sections FGC 3400-3409 contain the subject statutes.

Landowners have the right to charge access fees for hunting, fishing, and other recreation on their property. The Department carefully reviews each plan to ensure that required habitat improvement efforts benefit many species of wildlife and that harvest strategies comply with accepted goals and objectives for management of the game species involved. The PLM Program further allows the Commission to authorize hunting and fishing seasons and bag limits specific to licensed PLM areas pursuant to

approved management plans.

The PLM Program currently is an element of the Department's elk management program. During 2015, five landowners offered opportunities to hunt Rocky Mountain elk, 33 landowners offered opportunities to hunt tule elk, and 12 landowners offered opportunities to hunt Roosevelt elk through the PLM Program. It is anticipated that up to three additional landowners will enroll in the program and hunt Roosevelt elk in 2016 and potentially two will enroll and hunt tule elk in 2016.

During 2016, the Department does not expect major changes to the PLM participants identified in Appendix 18.

Cooperative Elk Hunting Area hunts (Section 555, Title 14, CCR).

To encourage protection and enhancement of elk habitat and provide eligible landowners an opportunity for limited elk hunting on their lands, the department may establish cooperative elk hunting areas and issue license tags to allow the take of elk (Appendix 19 Section 555, Title 14, CCR). The existing regulations also provided for up to 40 tags through the Cooperative Elk Hunting Program during 2015, however only 30 tags were issued.

POLICY CONSIDERATIONS

The Legislature formulates 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, FGC). The policy includes several objectives, as follows:

1. To provide for the beneficial use and enjoyment of wildlife by all citizens of the State;
2. To perpetuate all species of wildlife for their intrinsic and ecological values, as well as for their direct benefits to man;
3. To provide for aesthetic, educational, and non-appropriative uses of the various wildlife species;
4. To maintain diversified recreational uses of wildlife, including 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;
5. 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;

6. To alleviate economic losses or public health and safety problems caused by wildlife; and
7. To maintain sufficient populations of all species of wildlife and the habitat necessary to achieve the above-stated objectives.

With respect to tule elk, the Legislature has established the State's policy regarding management in sections 332, 3951 and 3952, FGC. Section 332 provides that the Commission may determine and fix the area or areas, the season and hours, the bag and possession limit, procedures for making elk hunting tags available (including fund-raising tags), and the number of elk that may be taken under the rules and regulations of the Commission. This law also provides that the Commission may authorize the take of tule elk if the average of the Department's statewide tule elk population estimate exceeds 2,000 animals or the Legislature determines, pursuant to reports provided by the Department, that suitable areas cannot be found in California to accommodate such a number in a healthy condition. In addition to providing the Commission with the authority to authorize the take of tule elk pursuant to Section 332, Section 3951 requires that when relocating tule elk to suitable areas the Department shall cooperate to the maximum extent possible with Federal and local agencies, as well as private landowners. Sections 3951 and 3952 require that, when economic or environmental damage occurs, the Department shall manage tule elk herds at sound biological levels through the use of relocation, hunting, or other appropriate means, as determined by the Department. Section 3951 establishes a maximum tule elk population level of 490 animals in the Owens Valley.

The Department has concluded that the proposed project will not have a significant adverse effect on the environment. No mitigation measures or alternatives to the proposed project are needed.

GLOBAL CLIMATE CHANGE

Climate changes caused by increasing atmospheric concentrations of greenhouse gases are expected to result in marked changes in climate throughout the world (deVos, J.C. and T. McKinney, 2007). Although many wildlife habitats in North America have become progressively warmer and drier in the last 12,000 years, the greatest rate of change has occurred during the last 150 years (Fredrickson et al. 1998). Predicted changes due to continued warming include increased frequency and severity of wildfires, increased frequency of extreme weather events, regional variation in precipitation, northward and upward shifts in vegetative communities, and replacements of biotic communities. These changes are expected to affect abundance, distribution, and structure of animal and vegetative communities.

Local and specific regional changes in climate and associated changes in vegetative communities will be the determining factors regarding the distribution and abundance of elk in California. Although research specific to elk responses to climate change is

limited, what information does exist indicates that both adverse and beneficial effects - depending on a variety of local/regional factors such as latitude, elevation, topography, and aspect – can be expected to result. For example, in the Rocky Mountain National Park where snow accumulation currently limits elk winter range, computer simulations suggest a reduction in future snow accumulations of up to 25-40%. An expansion of winter range would serve to increase over-winter survival and recruitment of juveniles into the adult population, leading to an increase of the overall elk population in that area (Hobbs et al. 2006). Conversely, research in Banff National Park, Canada indicates climate change will result in colder winter temperatures, increased snowfall, and a higher frequency of winter storms (Hebblewhite, 2005). These factors would result in a decrease in over-winter survival and recruitment, leading to an overall reduction of the elk population for that area.

Elk hunting in California is regulated by the State Fish and Game Commission. Hunting seasons and tag quotas are proposed to the Commission for adoption on an annual basis. These seasons and quotas are based on annual population and harvest data, annual population model results, and area-specific population/harvest objectives. Although the impact of climate change on California's elk population is difficult to predict and warrants continued study, the Department and the Commission have the ability to quickly respond to population fluctuations (positive or negative) by increasing or decreasing hunter opportunity in accordance with current and future management objectives for this species. However, reducing one mortality factor (sport hunting) will not alone mitigate for impacts associated with global climate change; the ability to manage and provide adequate amounts of required habitats is the ultimate deciding factor in wildlife populations.

POTENTIAL FOR SIGNIFICANT EFFECTS

The potential for significant effects include impacts on the gene pool, impacts on social structure, effects on habitat, effects on recreational opportunities, effects on other wildlife species, effects on economics, effects on public safety, growth inducing impacts, short-term uses and long term productivity, significant irreversible environmental changes, welfare to the individual animal, and cumulative impacts.

The proposed project allows limited public, PLM, and Cooperative hunting of Roosevelt elk in six areas including all or portions of Del Norte, Humboldt, Mendocino, Tehama, Trinity, and Siskiyou counties. In addition, Rocky Mountain elk in portions of Lassen, Modoc, Monterey, Shasta, San Luis Obispo, and Siskiyou counties, and tule elk in portions of Alameda, Colusa, Fresno, Glenn, Kern, Kings, Lake, Mendocino, Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Clara, Solano, Sonoma, and Ventura counties. The project is designed to avoid adverse environmental impacts and will result in removing not more than 603 Roosevelt elk, 108 Rocky Mountain elk, and 621 tule elk as a result of hunting programs on an annual basis (Table 2, including PLM, SHARE, and Cooperative Elk Hunting). The number of tags issued to result in at or below the analyzed harvest is based on previous years average hunter success for the

corresponding zone and tag type. Of these tags not more than 255 tags will be issued to hunt at specific locations in California under the PLM Program. In summary, the proposed project will involve elk hunting (public, PLM, SHARE, and Cooperative elk tags) for six of the State's Roosevelt elk areas, three Rocky Mountain elk areas, and 16 tule elk areas.

TABLE 2
HARVEST LEVEL ANALYZED
(Includes General, SHARE, Cooperative, Military, and PLM)

Hunt Zones	Type	
Roosevelt Elk Hunts	**Bull**	**Antlerless**
Del Norte	42	62
Humboldt	64	65
Marble Mountain North	61	60
Marble Mountain South	61	60
Siskiyou	40	50
Roosevelt/Tule Elk Hunts		
Mendocino Lower Lake	0	0
Mendocino Middle Fork	12	11
Mendocino North Coast	18	20
Mendocino South Coast	1	1
Mendocino Upper Russian	12	16
Rocky Mountain Elk Hunts		
Northeastern California	40	40
PLM hunts outside northeast	15	13
Tule Elk Hunts		
Bear Valley	8	11
Cache Creek	4	3
East Park	4	10
Lake Pillsbury	6	7
Alameda	3	2
Grizzly Island	32	70
Santa Clara	10	10
Camp Roberts	15	30
FHL Central Coast	40	70
La Panza	50	70
San Emigdio	10	24
San Luis Reservoir	15	30
Owens Valley Hunts	25	9
Total	**588**	**744**
Total Maximum Harvest	**1332**	

Elk hunting will result in the death of individual animals. The removal of individual animals from selected herds which are relatively large and healthy will not significantly reduce herd size on a long-term basis. Production and survival of young animals within each herd will replace the animals removed by hunting (Fowler 1985, Racine et al. 1988). Since public elk hunting will affect no more than 25 of the State's elk areas under the proposed project and all alternatives considered, removal of individuals will have little influence on the statewide elk population. The herds where hunting is proposed are geographically separated and widely distributed. The proposed project will result in maintaining the statewide tule elk population well above the legislative limit of 2,000 elk. Therefore, the proposed action of removing no more than approximately 1,077 elk by public hunting (general, SHARE, and Cooperative hunts) and 255 elk through the PLM Program will not have a significant adverse impact on either local or statewide elk populations (Table 2). The Department does not anticipate issuing up to the maximum number of tags in most areas but has analyzed that potential impact under the proposed project.

Appendix 20 describes the modifications from the 2015 elk hunting regulations the Department is proposing to incorporate in the 2016 elk hunting regulations. Appendix 21 describes the impacts these modifications will have on the twelve (12) factors examined in each of the prior nineteen (19) environmental documents (1988 through 2010 – Department files) certified by the Fish and Game Commission regarding elk hunting. The modifications proposed include adding two (2) entirely new hunt boundaries, splitting four existing hunt zones into eleven (11) zones, expanding two (2) hunt zones, modifying one (1) hunt boundary, adding additional periods to six (6) hunt zones, modifying season dates for one (1) hunt zone, modifying tag ranges for ten (10) elk zones, modifying available hunt areas for one (1) archery only elk hunt, and modifying season dates for the fund raising tags.

Methodology

A computer model which simulates herd performance (Smith and Updike 1987) was used to assess effects of the proposed action on elk herds where hunting is anticipated.

A variety of natural and human-induced factors combine to affect the status of a wildlife population. Natural factors affecting elk populations include, but are not limited to, such things as predation, starvation, disease, and parasitism. Environmental factors (e.g., precipitation) can affect food quantity and quality, thereby affecting elk populations. Theoretically, competition among members of the same species and between different species (e.g., deer, elk) also can affect elk populations. Catastrophic events (e.g., wildfires) can affect localized populations on a short-term basis. Human-induced factors, such as urbanization and agricultural development, also affect elk populations.

Hunting can affect a population in various ways, depending on the intensity and level of harvest.

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 affect 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 human-induced and natural events on wildlife and their habitat.

Population models can range from simple word models (the statement "elk are born, grow up, reproduce and die" is a grossly simple word model of a population process) to highly complex and sophisticated mathematical abstractions. Some models are empirical (that is, based on observed 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. 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 occurrences.

There are numerous software packages available to aid in the analysis of data from elk populations and their ranges. To effectively investigate the combined effects of hunting on an elk population, a population model which acts dynamically 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). This modeling will be discussed further.

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 are consistent.

Compensatory Response

The Stock-Recruitment model (Ricker 1954, McCullough 1984) is useful for conceptualizing compensatory mechanisms and density-dependent responses that are believed to occur in wildlife populations. This model shows population responses to changes in density in terms of net recruitment (i.e., the survival of calves). 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 calf survival is a function of population density and decreases as density increases (the converse is also true). There is a large body of evidence indicating that this is the case among populations of elk (McCullough 1979, Clutton-Brock et al. 1982). Thus, density can be measured in either absolute or relative terms, and with net recruitment one can begin to build a model that will allow predictions of the population's response to changes in density.

At a low population size, even with a high recruitment rate, few new individuals enter the population, but their survival is higher. As population size increases, so does the number of recruits, up to a certain level. The rate of recruitment decreases as a result of lower survival of young. The degree of elk harvest necessary to achieve maximum sustained yield (MSY) can be expected to result in low population densities. Objectives to maximize residual population size and MSY are necessarily mutually exclusive. This has important implications for harvest management, as harvesting to achieve MSY suppresses the total population below its maximum potential. Spring population size (after calves are born) is thus below the carrying capacity of the range (McCullough 1984).

At high densities, the premortality population will temporarily exceed carrying capacity (if the area is at carrying capacity – few of California's elk populations are believed to be at carrying capacity), resulting in possible habitat damage. When population sizes are at or near the range carrying capacity, yield will be low (proportionately), because recruitment of calves is low relative to herds at lower density. In such cases, increases in harvest result in increased net recruitment, and the population will stabilize at a new population size if the new harvest level remains fixed (McCullough 1984).

Elk Pop (Smith and Updike 1987) is a microcomputer-based model which was developed by the Department for the purpose of analyzing harvest alternatives. Elk Pop was used to assess effects of the proposed project (and project alternatives) on the specific Roosevelt, Rocky Mountain, and tule elk herds where hunting is proposed. The model allows the user to vary carrying capacity to reflect real-world changes in habitat capability. Observed population age and sex ratios are primary input to the model. Elk Pop allows analysis of multiple harvest alternatives simultaneously and is easily adapted to most herd situations.

Elk Pop utilizes data on age and sex composition of the herd, maximum calf survival, estimated population numbers, nonhunting mortality, and hunting mortality. Age and sex composition and maximum calf survival figures used in the model are based on actual observed rates. Population level and nonhunting mortality rates were estimated. Estimates of nonhunting mortality rates were considered valid representations of actual nonhunting mortality rates when the model predicted the observed herd composition ratios for 10 consecutive years. Effects of various harvest scenarios were then predicted on the basis of observed composition ratios and estimated nonhunting

mortality rates. The computer model runs for various harvest scenarios (proposed project and the alternatives) for each elk herd where hunting is proposed can be found in Appendix 4.

IMPACTS OF HUNTING ON ELK POPULATIONS

Elk hunting will result in the death of individual animals. The removal of individual animals from selected herds which are relatively large and healthy will not significantly reduce herd size on a long-term basis. Production and survival of young animals within each herd will replace the animals removed by hunting (Fowler 1985, Racine et al. 1988). Since public elk hunting will affect no more than 26 of the State's elk areas under the proposed project and all alternatives considered, removal of individuals will have little influence on the statewide elk population. The herds where hunting is proposed are geographically separated and widely distributed. The proposed project will result in maintaining the statewide tule elk population well above the legislative limit of 2,000 elk. Therefore, the proposed action of removing no more than 1,077 elk by public hunting and 255 elk through the PLM Program will not have a significant adverse impact on either local or statewide elk populations (Table 2).

Numbers of elk harvested in the Big Lagoon, Klamath, Marble Mountains, Northeastern, Northwestern, and Siskiyou hunts during 2014 are reported in Table 3. Table 3 includes Roosevelt and Rocky Mountain elk that were taken by hunters in the PLM, public and Cooperative Elk Hunting programs. The Big Lagoon and Klamath hunts are no longer utilized hunt zones and currently (2015) fall within the Northwestern elk hunt boundary.

Roosevelt and Rocky Mountain Elk Units

Siskiyou Roosevelt Elk Herds

There are 600-750 elk within the hunt area boundary. The proposed project would result in a maximum of 40 bulls and 50 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and either-sex tags would be issued across three general hunt periods and one archery/muzzleloader only.

Computer simulation runs of this harvest scenario (90 elk killed, 40 bulls and 50 antlerless) indicate the population would continue to expand in total numbers and suggest that the calf-to-cow ratio will increase as a result of the proposed project. Based on computer simulation, the bull-to-cow ratio would also increase as a result of the proposed project. The Department will continue to monitor this population and will adjust the tag quota if the bull-to-cow ratio decreases as a result of the proposed quota.

TABLE 3
Roosevelt and Rocky Mountain Elk Harvest in 2014

Herd	PLM		General Season		Cooperative Elk Hunting		Total
	Bulls	Cows	Bulls	Cows	Bulls	Cows	
Marble Mountains			21	5	4	0	30
Siskiyou			11	5	3	2	21
Northwestern			22	3	2	0	27
Klamath			1	0	0	0	1
Big Lagoon			5	0	0	0	5
Northeastern			11	6	1	1	19
PLM - Roosevelt	10	4					14
PLM – Rocky Mtn.	14	4					18
Total	24	8	71	19	10	3	135

Although the proposed project may result in up to 90 individual elk in the Siskiyou hunt being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local population (herd). In fact, available information suggests that elk population numbers within the hunt area in Siskiyou County have increased since the Commission authorized this hunt in 1986.

Prior to implementation of the hunt, Fischer and Kitchen (1984) observed a minimum of 51 individuals in the herd (based on 21 months of field study) and suggested that there were less than 100 elk within what is now the hunt boundary. Current estimates are over 600 elk within the hunt area.

Based on computer simulation modeling of the expected harvest levels, the Department concludes that the proposed project of harvesting up to 90 elk for the Siskiyou Roosevelt elk hunt will not have a significant effect on regional or statewide Roosevelt elk populations. Population numbers have increased within the Siskiyou hunt boundary under current tag allocation levels.

Marble Mountains Roosevelt Elk Herds (Marble Mountain North & Marble Mountain South)

Since 1985, the Department has released 253 Roosevelt elk in western portions of the Klamath National Forest in an effort to reestablish herds within suitable portions of their historic range. This effort appears to have been successful. Kitchen and Woodard (1995) reported elk population numbers in and near the Happy Camp portion of the hunt area were approximately 300 and continuing to increase. Additional elk are distributed in the following locations: Salmon River drainage, Cecilville, Doggett Creek, Hilt, Alex Hole, Ukonom, Somes Bar, Klamath River, Weaverville, Trinity Alps Wilderness Area, and others. The proposed regulations split the zone into a north and south unit. Simulation runs for both Marble Mountain North and Marble Mountain South were run to model effects of the proposed Roosevelt elk hunts. The Department estimated population numbers at 1500 elk in the north and 1500 elk in the south.

The proposed project would result in a maximum of 61 bulls and 60 antlerless elk being harvested in each the north and south zones including, General, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and either-sex tags would be issued across three general hunt periods and one archery/muzzleloader only.

Computer simulation runs of this harvest scenario for each the north and south indicate that population numbers would increase in both the north and south if the proposed project was continued at the same level for a ten-year period. The bull-to-cow ratio would increase. The calf-to-cow ratio would also increase under the proposed harvest scenario.

The Department does not anticipate that this harvest scenario will result in adverse impacts to the Marble Mountains North or South Roosevelt elk herds. The apparent increasing trend in population numbers is suggestive that the population can withstand this level of hunting.

Northwestern Roosevelt Elk Herds (Del Norte and Humboldt)

The proposed regulations split the zone into two distinct units (Del Norte and Humboldt elk zones). Simulation runs for Del Norte and Humboldt zones were run to model effects of the proposed Roosevelt elk hunts. The Department estimated the Del Norte population at 725 elk and the Humboldt population at 850 elk.

The proposed project for the Del Norte zone would result in a maximum of 42 bulls and 62 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and either-sex tags would be issued across five general hunt periods.

Computer simulation runs of this harvest scenario for Del Norte indicate that population numbers would continue to increase over a ten-year period. The bull-to-cow ratio would increase, while the calf-to-cow ratio would increase and level off under the proposed harvest scenario.

The proposed project for the Humboldt zone would result in a maximum of 64 bulls and 65 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and either-sex tags would be issued across five general hunt periods.

Computer simulation runs of this harvest scenario for Humboldt indicate that population numbers would increase over a ten-year period. The bull-to-cow ratio would decrease and stabilize to an adequate level well above 25 bull-to-cow. The calf-to-cow ratio would increase and stabilize under the proposed harvest scenario.

The Department does not anticipate that this harvest scenario will result in adverse impacts to the Del Norte or Humboldt Roosevelt elk herds. The increasing trend in population numbers is suggestive that the population can sustain this level of hunting and continue to increase.

Northeastern California Rocky Mountain Elk Herds

Elk are endemic to northeastern California, and historically have occurred at various densities when conditions have been favorable (McCullough 1969). Their range has expanded during recent years and population numbers have increased. It is likely that elk emigrated to northeastern California from southern Oregon, and perhaps other locations in northern California. With successful reproduction, herds became established in suitable areas. Elk are not distributed uniformly throughout northeastern California. At present, elk can be found in larger numbers in four general areas: the Warner Mountains, Devils Garden, Whitehorse Reservoir and Burney/Pit River.

There are 1,000-1,500 elk within the hunt area boundary. The proposed project would result in a maximum of 40 bulls and 40 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and either-sex tags would be issued during an antlerless, bull and either-sex archery only season.

To model effects of the proposed Northeastern Rocky Mountain elk hunt, the Department assumed that maximum hunter success would result in a harvest of 40 bulls and 40 antlerless elk. Computer simulation runs of this harvest scenario indicate that total population numbers would continue to increase, and that an increase in the bull and calf ratio would occur.

The Department does not anticipate that this harvest scenario will result in adverse impacts to the Northeastern Rocky Mountain elk herds. The stable to increasing trend in population numbers is suggestive that the population can withstand this level of hunting.

Tejon Ranch PLM

In 1966, Mr. Rex Ellsworth obtained a permit to import Rocky Mountain elk from Yellowstone National Park to a fenced compound on his ranch in Kern County approximately 10 miles southwest of Tehachapi (Thomas 1975). In 1967, 290 elk were shipped and 277 were released within the enclosure. Mortalities over the next few months were attributed to capture stress, transport and confinement. By mid-1967 elk began to escape from the enclosure due to a lack of fence maintenance.

There are 170-200 elk within the hunt area boundary. The proposed project would result in a maximum of 12 bulls and 7 antlerless elk being harvested. Bull and antlerless tags would be issued during the season.

To model effects of the proposed Tejon Ranch elk hunt, the Department assumed that maximum hunter success would result in a harvest of 12 bulls and 7 antlerless elk. Computer simulation runs of this harvest scenario indicate that total population numbers would remain stable, and that an increase in the bull and calf ratio would occur.

The Department does not anticipate that this harvest scenario will result in adverse impacts to the Tejon Ranch elk herd. The stable trend in population numbers is suggestive that the population can withstand this level of hunting.

Hearst Ranch PLM

There are approximately 130 elk on the PLM. These are Rocky Mountain Elk outside of their historic range in Monterey and San Luis Obispo counties. The proposed project would result in a maximum of 6 bulls and 6 antlerless elk being harvested. Bull and antlerless tags would be issued during the season. To model effects of the proposed Hearst Ranch elk hunt, the Department assumed that maximum hunter success would result in a harvest of 6 bulls and 6 antlerless elk. Computer simulation runs of this harvest scenario indicate that total population numbers would remain relatively stable, and that an increase in the bull and calf ratio would occur.

The Department does not anticipate that this harvest scenario will result in adverse impacts to the Hearst Ranch elk herd. The stable trend in population numbers is suggestive that the population can withstand this level of hunting.

Tule/Roosevelt Elk Units

Mendocino (North Coast, Middle Fork, Upper Russian, Little lake, and South Coast)

The proposed regulation splits and expands the zone into five distinct units (North Coast, Middle Fork, Upper Russian, Little lake, and South Coast elk zones). Simulation runs for these zones were run to model effects of the proposed tule/Roosevelt elk hunts. The Department estimated populations for the North Coast at 420 elk, Middle Fork at 250 elk, Upper Russian at 200 elk, Little lake at 20 elk, and South Coast elk at 40 elk.

The proposed project for the Mendocino North Coast zone would result in a maximum of 18 bulls and 20 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Computer simulation runs of this harvest scenario for Mendocino North Coast indicate that population numbers would remain stable to a small increase if this level of harvest was maintained for a ten-year period. The bull-to-cow and calf-to-cow ratio would increase under the proposed harvest scenario.

The proposed project for the Mendocino Middle Fork zone would result in a maximum of 12 bulls and 11 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Computer simulation runs of this harvest scenario for Mendocino Middle Fork indicate that population numbers would remain stable to a small increase if this level of harvest was maintained for a ten-year period. The bull-to-cow and calf-to-cow ratio would increase under the proposed harvest scenario.

The proposed project for the Mendocino Upper Russian zone would result in a maximum of 12 bulls and 16 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Computer simulation runs of this harvest scenario for Mendocino Upper Russian indicate that population numbers would slowly decrease if this level of harvest was maintained for a ten-year period. The bull-to-cow ratio would decrease slightly at first and then maintain close to the original level. The calf-to-cow ratio would increase under the proposed harvest scenario. The Department will continue to monitor this population and adjust tags if necessary.

The proposed project for the Mendocino Little lake zone would result in a 0 elk being harvested. These regulations would establish zone boundaries. Computer simulation runs of this scenario for Mendocino Little Lake (no harvest) indicate that population numbers would slowly increase over a ten-year period. The bull-to-cow and calf-to-cow ratio would increase under this scenario.

The proposed project for the Mendocino South Coast zone would result in a maximum of 1 bulls and 1 antlerless elk being harvested including, General, PLM, and SHARE elk tags. Computer simulation runs of this harvest scenario for Mendocino South Coast indicate that population numbers would slowly increase over a ten-year period. The bull-to-cow and calf-to-cow ratio would increase under the proposed harvest scenario.

Bull and antlerless tags would be issued across during the general, SHARE, and PLM hunt periods. The Department does not anticipate that this harvest scenario will result in adverse impacts to the Mendocino (North Coast, Middle Fork, Upper Russian, Little lake, and South Coast) tule/Roosevelt elk herds. The stable to increasing trend in population numbers is suggestive that the population can withstand this level of hunting.

Tule Elk Units

Numbers of tule elk harvested in the general elk zones and PLM during 2014 are reported in Table 4. Table 4 includes tule elk that were taken by hunters in the PLM, public and Cooperative Elk Hunting programs.

TABLE 4
Tule Elk Harvest in 2014

Herd	PLM		General Season		Cooperative Elk Hunting		Total
	Bulls	Cows	Bulls	Cows	Bulls	Cows	
Alameda			0	0			0
Bear Valley			1	0			1
Cache Creek			3	2			5
East Park			2	2			4
Fort Hunter Liggett			9	4			13
Grizzly Island			16	28			44
Lake Pillsbury			2	4			6
La Panza			12	11	0	1	24
Mendocino			2	1			3
Owens Valley			26	0			26
San Luis Res.			3	0			3
Santa Clara			1	0			1
PLM - Tule	58	46					104
Total	58	46	77	52	0	1	234

Alameda Tule Elk Herds

There are 100-200 elk within the hunt area boundary. The proposed project would result in a maximum of 3 bulls and 2 antlerless elk being harvested including, General,

PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would continue to expand in total numbers and suggest that the calf-to-cow ratio will increase as a result of the proposed project. Based on computer simulation, the bull-to-cow ratio would decrease slightly and then stabilize as a result of the proposed project. The Department will continue to monitor this population and will adjust the tag quota if the bull-to-cow ratio further decreases.

Although the proposed project may result in up to 5 individual elk in the Alameda zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Bear Valley Tule Elk Herds

There are 225-250 elk within the hunt area boundary. The proposed project would result in a maximum of 8 bulls and 11 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would stay relatively the same in total numbers and suggest that the calf-to-cow ratio will increase as a result of the proposed project. Based on computer simulation, the bull-to-cow ratio would also increase.

Although the proposed project may result in up to 19 individual elk in the Bear Valley zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Cache Creek Tule Elk Herds

There are 125--150 elk within the hunt area boundary. The proposed project would result in a maximum of 4 bulls and 3 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would stay relatively the same in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 7 individual elk in the Cache Creek zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Camp Roberts Tule Elk Herds Tule Elk Herds

Camp Roberts is a newly proposed hunt. The Camp Roberts herd was established in 1978 with 21 elk from Tupman. Thirteen more elk from Tupman were released in 1983. Several animals from each release were fitted with radio transmitters and monitored. A total of 88 elk was observed during a helicopter survey of Camp Roberts in 1988. Additionally, in 1991, the Department released 13 tule elk (from Grizzly Island) on a private ranch near San Ardo in southern Monterey County; in 1992 an additional 20 were released at the same location (Department of Fish and Game, 1995). Approximately 136 elk were counted during a January, 2014 survey and 524 elk were counted in January, 2015. Some of the elk counted in 2015 are believed to be double counts. The Department estimates there are 300-400 elk within the hunt area boundary.

The proposed project would result in a maximum of 15 bulls and 30 antlerless elk being harvested including General and Military tags. Bull and antlerless tags would be issued during the general and Military seasons.

Computer simulation runs of this harvest scenario indicate the population would slowly increase in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 45 individual elk in the Camp Roberts zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

East Park Tule Elk Herds

There are 120--150 elk within the hunt area boundary. The proposed project would result in a maximum of 4 bulls and 10 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would stay relatively the same in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 14 individual elk in the East Park zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Fort Hunter Liggett (Fort Hunter Liggett Central Coast) Tule Elk Herds

The proposed regulation modifies and expands the zone boundaries for Fort Hunter Liggett and changes the name to Fort Hunter Liggett Central Coast. Simulation runs for

Fort Hunter Liggett Central Coast were run to model effects of the proposed tule elk hunts. The Department estimated there are approximately 825 to 1,000 elk within the zone boundary. The proposed project would result in a maximum of 40 bulls and 70 antlerless elk being harvested including, General, Military, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and either-sex tags would be issued during the general, military, archery, muzzleloader, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would stay relatively the same with a small increase in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 110 individual elk in the Fort Hunter Liggett Central Coast zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Grizzly Island Tule Elk Herds

The proposed regulation modifies and expands the zone boundaries for the Grizzly Island tule elk zone. Simulation runs for Grizzly Island were run to model effects of the proposed tule elk hunts. The Department estimated there are approximately 300 elk within the zone boundary. The proposed project would result in a maximum of 32 bulls and 70 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull, antlerless, and spike tags would be issued during the general, SHARE, and PLM seasons (Currently there are no PLM's in this area).

Computer simulation runs of this harvest scenario indicate the population would decrease in total numbers (with a future reduction in harvest) and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project. The current population level for this herd is above objectives and the proposed project would bring population levels within objectives.

Although the proposed project may result in up to 102 individual elk in the Grizzly Island zone being killed by hunters, the proposed level of harvest would be reduced in future years once the population was back within objectives (250 elk) and at that point will not have a significant negative effect on the local or statewide population.

Lake Pillsbury Tule Elk Herds

There are 150--180 elk within the hunt area boundary. The proposed project would result in a maximum of 6 bulls and 7 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would stay relatively the same in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 13 individual elk in the Lake Pillsbury zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

La Panza Tule Elk Herds

The proposed regulation modifies the zone boundaries for the La Panza tule elk zone. Simulation runs for La Panza were run to model effects of the proposed tule elk hunts. The Department estimated there are approximately 700 elk within the zone boundary. The proposed project would result in a maximum of 50 bulls and 70 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would increase and then decline over time but still being above the initial population estimate. Simulation runs suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 120 individual elk in the La Panza zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Owens Valley Tule Elk Herds (Bishop, Goodale, Independence, Lone Pine, Tinemaha, Tinemaha Mountain, West Tinemaha, and Whitney)

The Owens Valley tule elk hunt zones are separated into eight distinct zones (Bishop, Goodale, Independence, Lone Pine, Tinemaha, Tinemaha Mountain, West Tinemaha, and Whitney zones). Currently there are seven hunt zones with the proposed splitting of the Independence hunt zone (creating a Goodale zone). Simulation runs for these zones were run to model effects of the proposed tule elk hunts.

Tule elk herds in the Owens Valley have demonstrated their ability to experience reductions in herd size without long-term adverse impacts on either local, regional, or statewide populations (Fowler 1985). Previous hunts had no long-term adverse impact to the Owens Valley tule elk population because minimum population numbers regularly exceeded 490 (the maximum level specified by Public Law 94-389 and Section 3951, FGC) during the 1970s and 1980s, based on survey results. Current population levels are below 490 and the proposed project allows for harvest levels to maintain the population below the mandated 490 elk.

The proposed project would result in a maximum of 25 bulls and 9 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull and antlerless tags would be issued during the general, SHARE, and PLM seasons (Currently there are no PLM ranches within the Owens Valley).

Computer simulation runs of this harvest scenario indicate the population would increase over time. Simulation runs suggest that the calf-to-cow ratio would increase slightly and stabilize. The bull-to-cow ratios would initially decrease and then fluctuate around 30.

Although the proposed project may result in up to 34 individual elk in the Owens Valley zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

San Emigdio Tule Elk Herds

San Emigdio is a proposed new hunt. In January of 1998, five sub-adult bulls and 15 cows from San Luis Refuge were released in San Emigdio Canyon on land owned by the Wildlands Conservancy. Three translocation events occurred in October of 1999 when three bulls and 34 cows from Concord Naval Weapons Station were released to augment the initial effort. In February, 2005, two bulls and 19 cows from San Luis Refuge were released. In 2013, two adult bulls, two yearling bulls and two cows from San Luis Refuge were released. In March, 2014, an additional 15 cows and calves (i.e., born in 2013) from San Luis Refuge were released.

The Department estimates the population to be between 360-400 elk. The proposed project would result in a maximum of 10 bulls and 24 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull antlerless tags would be issued during the general, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would increase in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 34 individual elk in the San Emigdio zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

San Luis Reservoir Tule Elk Herds

Twenty-one elk from Concord Naval Weapons Station were released on a private ranch south of the San Luis Reservoir to re-establish tule elk in the unit in 1990. Elk dispersed widely from the release site (BLM 1992). In 1992, eight more cows and one bull from Grizzly Island were added and nine more cows and one bull from Tupman were added in 1998.

The Department estimates the population to be 390-450 elk. The proposed project would result in a maximum of 15 bulls and 30 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull antlerless tags would be issued during the general, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would increase in total numbers and suggest that the calf-to-cow and bull-to-cow ratios would both increase as a result of the proposed project.

Although the proposed project may result in up to 45 individual elk in the San Luis Reservoir zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

Santa Clara Tule Elk Herds

Sixty-five tule elk from the Owens Valley were released on private ranches in southern Santa Clara County near Mt. Hamilton from 1978-1981. These elk dispersed into portions of Alameda, San Joaquin, Santa Clara and Stanislaus counties. Tule elk also have been released at various locations outside the unit since 1981 (in south San Benito County, western Merced County and south Monterey County); some of which subsequently dispersed into the unit. Finally, 9 adult bulls from San Luis National Wildlife Refuge were released at the San Antonio Valley Ecological Reserve (Santa Clara County) in March, 2014.

The Department estimates the population to be 160-180 elk. The proposed project would result in a maximum of 10 bulls and 10 antlerless elk being harvested including, General, PLM, SHARE, and Cooperative elk tags. Bull antlerless tags would be issued during the general, SHARE, and PLM seasons.

Computer simulation runs of this harvest scenario indicate the population would increase in total numbers. The bull-to-cow ratio would decrease to an appropriate level, while the calf-to-cow ratio would increase under the proposed harvest scenario.

Although the proposed project may result in up to 20 individual elk in the Santa Clara zone being killed by hunters, the information provided indicates the proposed level of harvest will not have a significant negative effect on the local or statewide population.

IMPACTS ON THE GENE POOL

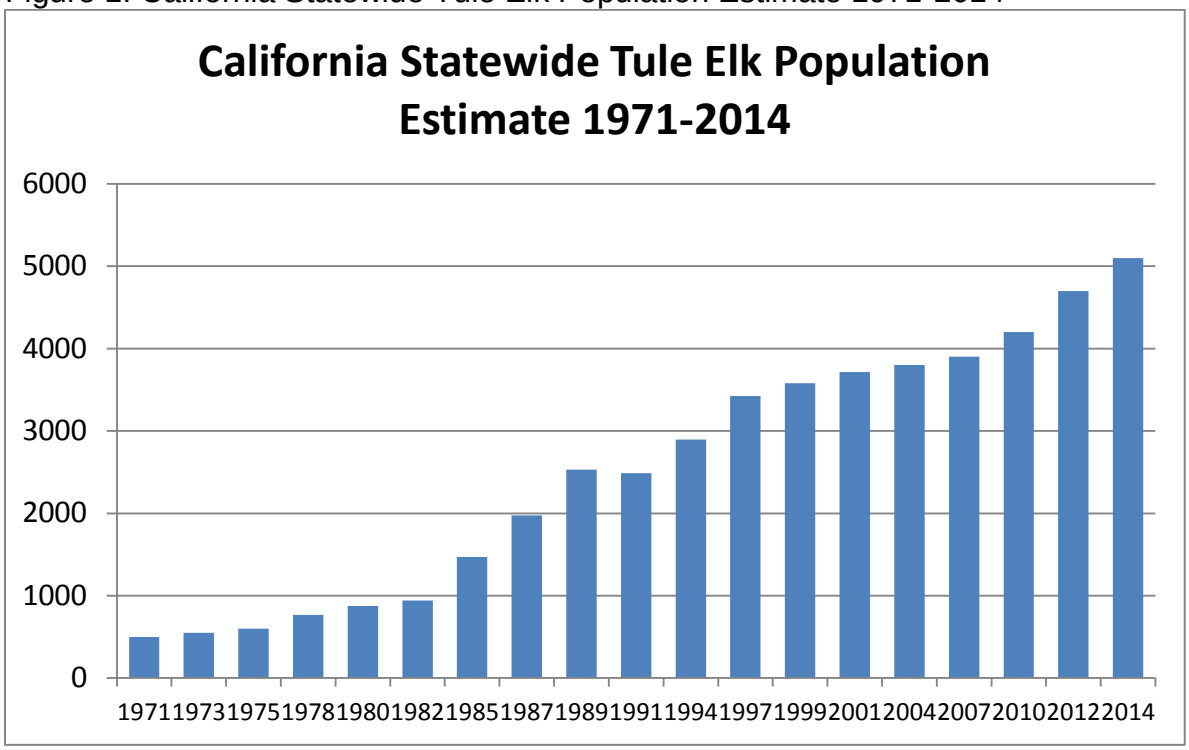
The Department estimates there are a minimum of 5,000 Roosevelt elk distributed throughout several areas of northern California. The proposed project would allow the total public take (harvest) of no more than 603 Roosevelt elk from six areas. Assuming

a condition where all tagholders were successful, this would result in a short-term reduction of twelve percent of the statewide Roosevelt elk population. This does not constitute a significant impact to the statewide gene pool and is well within the population's ability to maintain or increase in size over the long term.

As reported previously, the Department estimates there are a minimum of 1,500 Rocky Mountain elk in the State. The majority of Rocky Mountain elk occur in three separate areas of the State. The proposed project would allow the take of no more than 108 elk from the Northeastern California hunt zone and two PLM's with Rocky Mountain elk outside of their historic range. It is expected that 23-28 elk will be taken from the Tejon Ranch in Kern and Los Angeles counties and the Hearst Ranch in Monterey and San Luis Obispo counties. This level of harvest is far below the population's sustained-yield level. Therefore, the expected combined (public and PLM) take of less than 110 Rocky Mountain elk from a statewide population of over 1,500 will be a short-term reduction of less than 7.5 percent of the statewide population. This does not constitute a significant impact to the statewide gene pool and is well within the population's ability to maintain or increase in size over the long term.

As of August 2015, the average of the Department's statewide tule elk population estimate was at least 5,100 animals. The statewide tule elk population has been increasing since 1971, based on Department surveys and estimates (Figure 1). The 22 tule elk herds in the State are widely distributed throughout the coastal range of California from northern Santa Barbara County to central Mendocino County. In addition, tule elk are located in the Owens Valley and the San Joaquin Valley (see Appendix 14). There are free ranging tule elk found outside of established elk zones including Point Reyes National Seashore. In addition to the free ranging tule elk there are three fenced enclosures containing tule elk within California (Point Reyes National Seashore, San Luis National Wildlife Refuge, and Tupman Tule Elk State Preserve).

Figure 1. California Statewide Tule Elk Population Estimate 1971-2014



Assuming a condition where the analyzed maximum harvest was reached (including general, SHARE, PLM, and Military), 621 tule elk would be removed from the statewide population (5,100 animals). This short-term reduction of approximately twelve percent of the statewide tule elk population does not constitute a significant impact to the gene pool and is well within the population's ability to maintain or increase in size over the long term. The Department does not anticipate harvesting up to the maximum level but has analyzed the potential for each zone. Computer simulation modeling of the proposed harvest levels will not have a measurable impact on regional or statewide populations.

It is expected that not more than 255 elk (Rocky Mountain, Roosevelt, and tule elk combined) will be taken by hunters under the PLM Program during 2016. This constitutes just over two percent of the statewide elk population and is well within the population's ability to maintain or increase in size over the long term. Any population reduction from the PLM Program would be short term and would not constitute a significant impact to the gene pool.

The ability of elk populations to experience a given level of hunting mortality without decreasing in health or viability is described by Savidge and Ziesenis (1980) as sustained-yield management. Sustained-yield management is closely related to the compensatory responses in reproduction that were discussed previously.

Because the proposed project involves herds at separate locations within the State that are at or above herd management objectives and because the proposed project will not significantly reduce statewide population levels, the Department concludes that there will not be an adverse impact to the gene pool, either locally or statewide.

IMPACTS ON SOCIAL STRUCTURE

Elk are gregarious and tend to form groups or aggregates. Elk do not mate for life. Males do not invest time or energy in the care of young, but generally form separate bachelor groups. Except for a short breeding period, most adult males generally remain separate from cow-calf groups during the remainder of the year. Therefore, removal of bulls by hunting will have a minimal effect on the social structure of the populations, provided that minimum herd objective bull ratios are maintained. Proposed harvest levels for each herd have been established to maintain or exceed minimum herd objective bull ratios and to provide for genetic variability, fertilization of cows, and public viewing opportunities of bull elk.

During the nonbreeding period, cow-calf groups generally contain few, if any, adult bulls. However, immature bulls are tolerated in cow-calf groups (Geist 1982). Newborn calves are initially completely dependent upon their dams but quickly adjust to the cow-calf group and form nursery groups within the larger group. Nursery groups briefly fixate and respond to a succession of adult females (Geist 1982). During the first 2.5 months of life, calves nurse extensively (Bubenik 1982). Nursing declines by August for most elk in California, when the proposed project would begin in some areas. There is no indication that calves orphaned at this time have been severely impacted; at Grizzly Island, tule elk calves orphaned in August remained within the social structure of the groups.

Generally, the proposed project has the potential to increase the ratio and number of calves in the hunted elk populations. The increase in calf survival results in a shift of age structure of the elk population from older to prime-age individuals (five to seven years). These prime-age individuals tend to provide higher recruitment rates (calf survival) for the population (Hines et al. 1985). Historical data (Fowler 1985, Botti and Koch 1988, Racine et al. 1988), computer simulation modeling (Smith and Updike 1987), and information from the literature (Taber et al. 1982) indicate that the removal of elk from the population (due to hunting, trapping for reintroduction, or high winter mortality) in one year results in a larger number of calves recruited into the population the following year.

Computer simulation modeling of the populations proposed to be hunted indicates that the removal of elk from these populations by hunting (in addition to nonhunting mortalities) will result in an increased survival of calves born the following spring for most areas (Appendix 4). As an example, in August of 1980 the observed calf ratio for the Bishop subherd was 20 calves per 100 cows. In December of 1980, the Department relocated 75 elk from the Bishop subherd. The following August (1981), the

observed calf ratio was 43 calves per 100 cows. This type of increased calf survival (recruitment) has been observed numerous times in the Owens Valley (Racine et al. 1988) and at Grizzly Island (Botti and Koch 1988).

Most western states establish a goal for a posthunt ratio of at least 20 bulls per 100 cows (the proportion of bulls to cows in the population). Some states have goals as low as six bulls per 100 cows, while other states have goals of 25 bulls per 100 cows in trophy hunt areas (Mohler and Toweill 1982). The Department's management objective for most hunted populations is to maintain at least 25 bulls per 100 cows. Specific management plans for most tule elk herds contain post-hunt sex ratio objectives of at least 25 bulls per 100 cows (the management plan for Grizzly Island calls for 45-70 bulls per 100 cows to allow for additional opportunities to view bull elk).

Most tag quotas (Tinemaha Mountain is an exception) provide for take of both male and female elk. Achieving and/or maintaining herd objective bull-to-cow ratios is accomplished most readily by harvest of both sexes, because harvesting only male elk can skew the sex ratio towards females; and, conversely, harvesting only female elk can result in a population skewed towards males (Mohler and Toweill 1982).

Based on the computer simulation analysis of expected harvest rates, for most of the proposed hunts, the post-hunt bull-to-cow ratios are expected to increase and/or remain above the Department's management objective of 25 bulls per 100 cows. Additionally, computer simulation modeling of the herds proposed for hunting indicates that the proposed take is within sustained-yield management levels. That is, under the proposed harvest levels, the population will be able to maintain itself over the long term at existing or higher population levels.

As discussed earlier, female pregnancy rates and calf survival are inversely related to the density of the elk herd in relationship to the condition of the available habitat. Management that provides for frequent reductions in female and young of the year elk in areas where elk have exceeded their herd size objective encourages age structure dominated by reproductively successful females (Hines et al. 1985).
Based on computer simulation modeling, the proposed project has the potential to increase calf survival rates for the hunted herds, resulting in improved general health of the hunted populations. Also, computer simulation modeling predicts minimal changes in bull-to-cow ratios as a result of the proposed project; such ratios for most hunted herds are predicted to increase or remain near the minimum objective ratio. Bull-to-cow ratios are predicted to remain significantly above corresponding ratios for other western states with hunting programs. Thus, it is unlikely that adverse impacts to the social structure of hunted herds will occur as a result of the proposed project. By increasing calf-to-cow ratios, the proposed project would improve herd condition and could thus have a positive effect on herd social structure.

EFFECTS ON HABITAT

The removal of up to 603 Roosevelt elk, 108 Rocky Mountain elk, and 621 tule elk through public hunting and up to 255 elk through the PLM Program is not expected to significantly change elk population levels on a long term basis. If no major changes occur in the elk population levels, no major changes in elk-caused effects on habitat (e.g., elk foraging pressure on plants) would be expected. Therefore, the proposed project is not expected to have an impact on habitat in the hunt areas.

The typical technique used to hunt elk within the proposed hunt areas involves spotting animals at a distance and/or quietly approaching them on foot to within a reasonable shooting range. Hunting from a motorized vehicle is illegal. Some hunters may use horses to cover greater distances searching for elk. In any case, the relatively low intensity of hunting effort (because of the low number of elk hunters in the field) within these areas is not expected to produce major effects on habitat.

Both public and private lands occur within the hunt areas. On public lands, the Department provides input to the USFS regarding actions to improve the condition of elk herds and their habitat. Further, the USFS is mandated to incorporate wildlife needs, including elk, into their planning process, as required by the National Forest Management Act. In general, current timber harvest practices on public land benefit elk by creating a diverse mosaic of early successional and mature forest habitat types. Most of the public lands proposed to be open to elk hunting within the Siskiyou, Marble Mountains, Del Norte, Humboldt, Mendocino, and Northeastern California hunt areas are currently open to the public on a year-round basis. These lands also are used for other outdoor recreational activities, such as fishing, photography, hiking, hunting, bird watching and general nature viewing. Due to the large size of the hunt areas (each area is several hundred square miles in size) and existing human use levels of the hunt areas, it is unlikely that the harvest of up to 711 elk will individually or cumulatively negatively impact the habitat in the hunt areas.

Almost the entire Alameda hunt zone consists of private property or public land not open to hunting. Access to these properties is strictly controlled and generally not available to the public. Due to the large size of the hunt area and existing human use levels, it is unlikely that the harvest of up to 5 elk will individually or cumulatively negatively impact the habitat in the hunt area.

Almost the entire Bear Valley hunt zone consists of private property or public land lacking consistent elk use. Access to these private properties is strictly controlled and generally not available to the public. Due to the large size of the hunt area and existing human use levels, it is unlikely that the harvest of up to 19 elk will individually or cumulatively negatively impact the habitat in the hunt area.

Approximately half of the Cache Creek tule elk hunt area is public land used for a variety of recreational activities. Removing a maximum of four bulls and three cows

from this area will result in only a short-term reduction of elk numbers. Historical data and computer simulation modeling of elk herd performance indicate subsequent spring calf recruitment will compensate for this reduction. Because the population level of the Cache Creek herd will not significantly change, the proposed action will not have an impact on the habitat in the Cache Creek tule elk herd area.

Camp Roberts is operated by the U.S. Army, and except during specific periods is not accessible to the public. Removing a maximum of 30 antlerless and 15 bulls from the Camp Roberts tule elk herds will result in an increase within the population over time. The proposed harvest is expected to be neutral to habitat quality.

A large portion of the East Park hunt zone consists of private property. Very little public land within the hunt zone has consistent elk use. The Bureau of Reclamation (BOR) does own property within the zone with consistent use by elk. A majority of the elk harvest since the hunts inception has taken place on the BOR property. The BOR land is also used for other outdoor recreational activities, such as fishing, camping, photography, hiking, bird watching and general nature viewing. Access to the private properties is strictly controlled and generally not available to the public. Due to the size of the hunt area and existing human use levels, it is unlikely that the harvest of up to 4 bull and 10 antlerless elk will individually or cumulatively negatively impact the habitat in the hunt area.

Fort Hunter Liggett is operated by the U.S. Army, and except during specific periods is not accessible to the public. The proposed project includes expanding the current zone boundaries. The majority of the zone expansion includes private property and a predominance of the elk outside of Fort Hunter Liggett base reside on private property. Removing a maximum of 70 antlerless and 40 bulls from the Fort Hunter Liggett Central Coast tule elk herds will result in an increase within the populations over time. The proposed harvest is expected to improve habitat quality.

The entire Grizzly Island Wildlife Area is public land; however, the wildlife area will be closed to other uses during the tule elk season. The proposed expansion of the boundaries includes additional private property. Access to these properties is strictly controlled and generally not available to the public. The Department does not anticipate any individual or cumulative adverse impacts to these lands. The proposed level of hunting at Grizzly Island (102 elk) has the potential to improve the quality of the elk habitat on the Island. The proposed level of harvest should be helpful in reaching herd objective population levels for Grizzly Island, and should prevent losses as a result of elk foraging on poison hemlock due to the lack of other suitable forage items.

Most of the public lands within the Lake Pillsbury hunt area are currently open to the public on a year-round basis. These lands also are used for other outdoor recreational activities, such as fishing, photography, hiking, hunting, bird watching and general nature viewing. Due to the size of the hunt areas and existing human use levels of the

hunt areas, it is unlikely that the harvest of up to 6 bull and 7 antlerless elk will individually or cumulatively negatively impact the habitat in the hunt area.

Approximately one-fourth of the La Panza hunt area is public land. For the La Panza tule elk herd, removing a maximum of 70 antlerless and 50 bulls will result in a short-term reduction of population numbers but the ten year trend will result in an increase in the population. Spring calf recruitment will compensate for any short-term population reduction. The proposed harvest is expected to have no impact on habitat quality.

The Mendocino elk hunt zones consists of private property or public land lacking consistent elk use. Access to these private properties is strictly controlled and generally not available to the public. Due to the size of the hunt areas and existing human use levels, it is unlikely that the harvest of up to 43 bull and 48 antlerless elk will individually or cumulatively negatively impact the habitat in the hunt area.

The Owens Valley tule elk hunt zones are accessible to the public and used for a variety of recreational activities. The removal of up to 34 individuals from the eight elk zones will allow the populations to increase but be managed below the mandated maximum number of 490 elk. The small increase in elk numbers should not have a measurable impact on habitat in the Owens Valley. Data collected by the Los Angeles Department of Water and Power since 1978 indicate that habitat conditions in the Owens Valley are primarily dependent upon the level of annual precipitation (Racine et al. 1988).

Almost the entire San Emigdio hunt zone consists of private property or public land with no consistent elk use. Access to the private properties is strictly controlled and generally not available to the public. Due to the large size of the hunt area and existing human use levels, it is unlikely that the harvest of up to 10 bull and 24 antlerless elk will individually or cumulatively negatively impact the habitat in the hunt area.

Most of the San Luis Reservoir hunt zone consists of private property. Very little public land within the hunt zone has consistent elk use or is open to hunting. The Department of Fish and Wildlife does own property (760 acre wildlife area) within the zone with consistent use by elk. A portion of the elk harvest since the hunts inception has taken place on the Department property. The Department land is also used for other outdoor recreational activities, such as hunting, photography, hiking, bird watching, and general nature viewing. Access to the private properties is strictly controlled and generally not available to the public. Due to the size of the hunt area and existing human use levels, it is unlikely that the harvest of up to 15 bull and 30 antlerless elk will individually or cumulatively negatively impact the habitat in the hunt area.

Nearly the entire Santa Clara hunt zone consists of private property. There is very little public land within the hunt zone. The Department of Fish and Wildlife does own property (2,900 acre ecological reserve) within the zone with consistent use by elk and is open to limited use by hunters. The Department land is also used for other outdoor recreational activities, such as hunting, photography, hiking, bird watching, and general

nature viewing. Access to the private properties is strictly controlled and generally not available to the public. Due to the size of the hunt area and existing human use levels, it is unlikely that the harvest of up to 10 bull and 10 antlerless elk will individually or cumulatively negatively impact the habitat in the hunt area.

EFFECTS ON RECREATIONAL OPPORTUNITIES

Hunting Opportunities

The proposed project would authorize public hunting of Roosevelt, Rocky Mountain, and tule elk, providing opportunities to harvest up to 1,332 elk by hunters who will participate in this unique outdoor experience. The demand for elk hunting opportunities is extremely high in California. In 2015, over 35,500 individuals applied for an opportunity to hunt elk in California. In 1988, for the first time, a nonrefundable fee of $5 was charged to apply for an elk hunt. Despite the new fee, almost 10,000 licensed hunters applied for elk license tags in 1988 with the number growing almost every year to date. The proposed project benefits the hunting public by providing hunting opportunities consistent with the State's Wildlife Conservation Policy and FGC sections 332 and 1801.

Season dates for several elk hunts may coincide, at least partially, with local deer seasons. However, it is unlikely that deer hunters will be adversely impacted by the low number of elk hunters that may be in the field during the deer season. Most tule elk hunts do not coincide with deer seasons or only partially overlap. Many of the elk seasons will overlap with upland game (quail, chukar, and rabbit) and bear season. Wild pig season is open all year many of the tule elk hunts will coincide with this season. The large areas open to hunting and the relative short elk season dates indicate that elk hunters will not affect hunters of other species of wildlife in terms of hunter success or quality of experience. The Grizzly Island Wildlife Area is not open to deer hunting. Primary hunting activities occurring at Grizzly Island are waterfowl and upland game hunting. The proposed tule elk hunting periods on the Island avoid other game seasons, so there will be no overlap with people hunting other game species.

Some individuals have expressed concern that the hunting regulations of other states might have adverse effects on elk hunting in California (presumably by causing an influx or exodus of hunters.) For the most part, non-resident public elk hunting opportunities on California are very limited (Only up to one elk tag per year is available for non-residents to draw, non-residents may purchase the three fund-raising elk tags, and are eligible to purchase elk tags through the PLM Program). The Department does not expect that the hunting regulations of other states will have an adverse effect on elk hunting in California.

Nonhunting Opportunities

Nonhunting users of the elk resource (viewing, nature study, and photography) will not be significantly impacted by the take of up to 1,332 elk from statewide populations of approximately 5,000 Roosevelt elk, 1,500 Rocky Mountain elk, and 5,100 tule elk. Nor will the proposed project impair the nonconsumptive users' ability to enjoy the outdoors, the elk resource, or its habitat, because the nonconsumptive user will have the opportunity to view elk herds in an unhunted situation indefinitely. Many elk herds inhabit Federal or State Parks, where hunting does not occur. Three of the State's 22 tule elk herds are maintained in a penned situation where no hunting is contemplated. These herds provide the public an opportunity to enjoy tule elk in their native habitat. Additionally, the proposed action does not provide hunting opportunities at Point Reyes National Seashore, which has a large population of tule elk and is accessible to the public for the enjoyment of elk and other wildlife in the area. Elk hunting seasons are limited in time and harvest reports from 2014 indicate that elk hunters spend on average 4 days hunting elk. This indicates that even for those hunted herds a majority of the time can be spent viewing elk without hunters in the field.
The proposed action will not impact the nonhunting public, because the number of hunters in the field at any one time (established by the quotas for each hunt), in conjunction with the areas open to hunting, will result in very low hunter density. Historically, all areas open for hunting have been open for other types of hunting (waterfowl, upland game birds, rabbit, wild pigs, black bear, etc.) during the same timeframe as the proposed elk hunts. If the nonhunter is concerned about being in the field during the proposed elk hunts, there are significantly larger areas of the same habitat type located adjacent to or near all hunt areas that can be used for nonhunting activities during the short elk hunting period.

EFFECTS ON OTHER WILDLIFE SPECIES

Although there is some overlap of food habits, competition between deer and elk has not been documented to be a problem in California. Nelson and Leege (1982) stated that "It would appear, therefore, that neither the elk nor the mule deer is affected seriously by the other, mainly because of differences in primary forage species and habitat choice." This also appears to be the case in California. Potential for competition between elk and deer can exist on critical winter ranges shared by the two species. But, there is no scientific evidence to indicate that removal of elk through a hunting program will adversely impact the local or statewide deer resource.

In some portions of the Owens Valley (primarily the Goodale subherd area), migratory deer and elk both utilize the same area. The elk use this range in the summer and are not present during the winter, when the area is used by deer (Racine et al. 1988). As indicated by Nelson and Leege (1982) and in the Owens Valley Tule Elk Habitat Management Plan, deer and elk generally do not use the same primary forage species. In an effort to verify this assumption, the Department has funded research conducted by the University of California to investigate deer and elk interactions in the Goodale tule elk subherd area. This research has been completed, confirming that deer and elk used

different primary forage plants in the Goodale area and that completion was minimal (Berbach 1991).

During the last few years, the potential for competition between deer and elk has received greater attention in the western states and provinces of North America. Many states and provinces have reported a decline in deer population numbers, coinciding with an increase in elk numbers. It has not been proven that elk displace deer or are a significant factor in suppressing their numbers throughout a broad geographic region. In considering the potential for competitive interaction between deer and elk, a variety of factors may be important such as predation, climate, digestive physiology, energetics, vegetation succession, livestock, and human-related factors. Lindzey et al. (1997) discussed these and other factors in reviewing the potential for competition between deer and elk throughout the west, and compiled an extensive list of references regarding this subject. They concluded that it is appropriate to question whether the growth of elk populations has contributed to apparent deer decline, but found no consistent trends in geographic areas used sympatrically to suggest a cause-and effect relationship.

Due to their large body size, adult elk experience limited predation. Cases of lion predation on adult elk have been documented (Taber et al. 1982, Booth et al. 1988, Racine et al. 1988). Results of fall surveys have documented several confirmed lion-killed elk since 1988. However, there is no scientific evidence to indicate mountain lion predation is having a significant effect statewide on elk in California as demonstrated by increases in elk numbers.

Coyotes, black bears, wolves, and mountain lions prey on elk and/or elk calves. It is possible that, as a result of removing adult elk from elk herds, there will be increased calf production the following spring. This could provide additional prey items for predators. Historical herd performance data collected on elk herds indicate that calf recruitment will increase after an elk removal, regardless of the existence of predators in the area (Racine et al. 1988). Based on a review of available information discussed in this document, it is reasonable to assume the proposed project will not have measurable short-term or long-term effects on other local wildlife populations, including deer, mountain lions, black bears, wolves, and coyotes.

A number of endangered, threatened or locally unique animals and plants may occur within the elk hunt areas. The Department is charged with the responsibility to determine if any hunting regulations will impact threatened or endangered species. It complies with this mandate by consulting internally and with the Commission when establishing elk hunting regulations to ensure that the implementation of the proposed project and existing hunting regulations do not affect these species. It is unlikely that adverse impacts to rare, endangered, threatened, or locally unique species associated with the proposed hunt areas will occur as a result of the proposed project. Most rare, endangered, threatened, or locally unique species associated with the hunt areas either are associated with habitats where elk hunting is not likely to occur or use these areas

during a time (season) different from when the proposed project will occur. The proposed project will involve a minimal number of hunters using areas that for the most part, are open to the public for a variety of uses, including hunting. The Department has concluded that, based on conditions of the proposed project and existing hunting regulations, differences in size, coloration, distribution, and habitat use between the listed species and elk, the proposed project will not jeopardize these species.

EFFECTS ON ECONOMICS

The proposed project will not result in changes to the environment, either directly or indirectly, which would produce significant negative environmental effects. Therefore, no CEQA review of economic effects is necessary. However, the proposed project has the potential to result in minor economic effects on the communities where elk hunting is proposed, and the discussion below is provided for the Commission and the public's information.

Data from the Department's Wildlife and License and Revenue Branches in conjunction with USFWS[1] data inform estimates of the total economic impact of Deer, Elk, Antelope, and Bighorn Sheep hunters throughout the state. Each year about 175,000 hunters spend about $1,161 each in hunting trip-related expenditures. These trip-related expenditures are dispersed to California businesses in the vicinity of and en route to the hunting areas. These direct expenditures generate indirect and induced effects resulting in $263,702,757 in total economic output.[2] Deer, Elk, Antelope, and Bighorn Sheep hunting is associated with about $51,947,191 in labor income or a total of 1,170 jobs in the state.

Economic Impact of Big Game Hunting Trip-Related Expenditures (resident & nonresident)

	Output	Labor Income	Jobs
Direct	**$202,390,334**	**$31,704,949**	**803**
Indirect	$21,568,669	$7,035,943	121
Induced	$39,743,754	$13,206,299	247
Total	**$263,702,757**	**$51,947,191**	**1,170**

Economic Impact of Elk Hunting

Sections 364, 364.1, 555, and 601 set dates and tag quotas for Elk hunting in the state. The approximately 415 Elk hunters alone are estimated to contribute about $269,175 per year in hunting trip-related expenditures. These trip-related expenditures generate indirect and induced effects resulting in $350,719 in total economic output. The combined economic effects of Elk hunters in these zones support as many as 1.56 jobs in the state.

1 USFW, *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation for California, Feb 2013.*

2 California state-wide multipliers generated with IMPLAN were used to estimate the total economic impacts for all Big Game Hunting.

Elk Hunting §364 Trip-Related Expenditures (resident & nonresident)			
	Output	Labor Income	Jobs
Direct	**$269,175**	**$42,167**	**1.07**
Indirect	$28,686	$9,358	0.16
Induced	$52,858	$17,564	0.33
Total	**$350,719**	**$69,089**	**1.56**

The effects of the Elk hunting regulations on the local economy may involve increases in economic activity near the hunt areas, as visiting hunters purchase goods and services from local merchants. This additional spending would generate additional retail sales, business spending, and income that could in turn, contribute to employment in motels, restaurants, and retail stores. Considered on a statewide basis, spending effects would be minor because of the small number of tags available. Any potential effects would be distributed between the regions where public hunting is proposed. The total economic impact of Elk hunting is estimated to not be of the magnitude to result in negative environmental effects.

Fiscal effects include direct public expenditures and revenue generation associated with the proposed project. The project will be administered by the State. Additional revenues will be directly generated by the $8.13 nonrefundable application fee and the $445.35 elk license tag fee. In 2015, more than 35,000 licensed hunters applied for Roosevelt, Rocky Mountain, and tule elk tags in California. Assuming a similar demand for elk hunting opportunities in the future, revenue generated from the project would be greater than the costs to the State to administer the program. The excess revenue would be used in the Department's Big Game Programs, as required by Section 3953, FGC.

EFFECTS ON PUBLIC SAFETY

Since 1989, the Department has received no reports of elk hunting-related casualties in California. This does not diminish the fact that people have died or been wounded while hunting other big game animals). Based on the total number of licensed hunters in California and the annual number of accidents, there is roughly a 0.00425-0.005 percent chance of being killed or wounded while hunting deer. Additionally, Department records show that no nonhunting injuries or deaths have occurred as a result of elk hunting. As with any outdoor activity, there is always a risk of injury or death. However, the probability of being injured while hunting elk is extremely low, especially in comparison to other recreational activities. 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. It is unlikely that the proposed project will result in adverse impacts to public safety.

GROWTH-INDUCING IMPACTS

There are no growth-inducing impacts associated with the proposed project. As discussed in "Effects on Economics" in this chapter, there will be minor increases in retail sales, income, and possibly employment in the regions where the proposed hunt areas exist. However, the small number of public tags available is unlikely to create growth-inducing impacts in a State with a total human population of over 30 million.

SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed project will not affect a variety of short-term uses currently available to the public. Additionally, the proposed project will provide for public hunting opportunity without adversely affecting long-term productivity of statewide or local elk populations, based on predictions of simulation modeling.

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 avoid adversely impacting hunted populations and to reach or maintain herd management objectives. The proposed project is designed to avoid significant adverse impacts to other wildlife species, their habitat, and listed or locally unique species. As discussed previously, adverse impacts to economics and public uses (including safety) are not expected.

WELFARE OF THE INDIVIDUAL ANIMAL

The 2004 analysis was presented on page 120 (incorporated by reference, April, 2006 Final Environmental Document, SCH#2003112075, available at 1812 9th street, Sacramento, CA 95811). 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 may nevertheless occur. The methods of take are not one hundred percent lethal. Lethality is largely a function of hunter skill and accuracy. The Department has evaluated the welfare of the individual animal and has specified minimum performance requirements for archery equipment and firearms in existing regulations.

CUMULATIVE IMPACTS

The proposed project provides for a specific level of public elk hunting in specified areas during 2016, and it is reasonably foreseeable that, the Commission would consider and approve hunts in these areas in the future. Because of this potential, the Department modeled population performance of hunted herds for a 10-year period. Potential effects of cumulative factors identified in this section were considered with the model runs. It must be emphasized that the model runs specify the same level of harvest (expressed as a percentage of the population) each year. In those runs demonstrating an increasing population the harvest level was capped to not increase above the initial

level. The statutorily mandated regulation process involves review and appropriate regulation changes based on the condition of a population. Data collected by the Department during the year following the approval or denial of the proposed project would be examined, and appropriate, biologically sound recommendations would be presented by the Department to the Commission prior to approval of any future hunt.

Section 207, Fish and Game Code, requires that the Commission review and consider revisions to regulations relating to mammal hunting. This law requires that the Commission receive recommendations regarding mammal hunting regulations from Commission members, its staff, the Department, other public agencies, and the public. The process is analogous to the Commission establishing specific harvest quotas for the deer and pronghorn antelope hunting seasons annually. The system has worked well over time in adjusting the hunting program annually to maintain healthy wildlife populations.

Effects of Private Lands Wildlife Habitat Enhancement and Management (PLM) Area Program

To become licensed in the PLM Program, landowners are required to submit an application package which includes a management plan. This plan must contain, among other things, habitat enhancement goals and objectives to be accomplished over the term of the five-year license. The habitat projects outlined in the plan are directed toward improving habitat for both game and nongame species. The ultimate goal of these habitat improvement practices is to enhance or stabilize (under adverse ecological conditions) populations of various wildlife species present on the area. Once licensed, the PLM is reviewed annually by the Commission to ensure compliance with all regulations and administrative procedures.

The PLM Program has been successful as an effective incentive for landowners to protect and improve wildlife habitat. Habitat improvements implemented under approved management plans on licensed areas include conducting controlled burns to improve forage conditions, reducing livestock grazing to reduce competition with wildlife, protecting wildlife fawning/nesting sites and riparian areas, developing wetland/marsh areas, constructing brush piles, improving water sources, and planting forage and cover crops for wildlife. The projects directly benefit deer, elk, bear, antelope, wild pigs, waterfowl, turkeys, quail, and a wide variety of nongame wildlife, including threatened and endangered species. Habitat improvements accomplished specifically for game species (such as riparian improvement, protection, and enhancement) directly benefit hundreds (approximately 331 species in hardwood-dominated habitats) of nongame wildlife species.

The anticipated PLM harvest for existing ranches was modeled as part of the overall (public and PLM) harvest simulation model run for the corresponding hunt zone (Appendix 4). PLM ranches outside of hunt zones were modeled separately. As discussed previously, no adverse impacts are expected, based on the simulation model

runs. To determine effects of harvest under the PLM Program for the Tejon Ranch and Hearst Ranch, the Department modeled the current condition and the proposed for the subject herds. Based on simulation model runs (Appendix 4), previous harvest levels have been below the maximum sustainable yield. Because the expected harvest under the PLM Program is less than the maximum sustainable yield (harvest), the Department has determined that the PLM Program, together with the proposed project, will not have a significant adverse cumulative effect on elk populations in California.

Fifty licensees participated in the PLM Program for elk in 2015 (Appendix 18). The Department does not recommend issuing more than 255 elk tags through the PLM Program for 2016 (tule, Roosevelt, and Rocky Mountain elk combined). Maximum quotas for the PLM Program were determined against the backdrop of the proposed public elk tag quotas. Previous total elk harvests under the PLM program have been below these levels (Approximately 136 elk were harvested in 2014 under the PLM program). Expected harvest under the PLM program should be below the maximum PLM quota. Thus, harvest under the PLM program either alone or combined with the proposal public harvest, will not have a significant adverse cumulative effect on statewide or local populations of elk.

Effects of Drought

Drought cycles are part of the ecological system in California and elk are adapted to dealing with low water years. Still, multi-year droughts can reduce elk populations on a local scale. Drought conditions can impact elk in a variety of including: degraded habitat quality (less vegetation growth) and lower food production (both natural and agricultural). 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.

Throughout much of the State, stream courses, natural lakes, ponds, springs, and reservoirs were affected by the recent drought. As far as terrestrial wildlife are concerned, prolonged drought in areas where water was already a rare commodity, such as in the desert and south coast ranges, may affect production and survival of young of a variety of species in future years. Droughts are cyclic over the long-term, and all wildlife species and their habitats in California have evolved under conditions of periodic drought (Bakker 1972, Munz and Keck 1973, Oruduff 1974, Burcham 1975, Barbour and Majors 1977). 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, oak-woodland, 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 a drought, because the seeds of annual plants would not germinate without adequate moisture, and shrubs and trees would have reduced growth as a water conserving strategy. Consequently, the quantity and quality of forage for herbivores would be reduced.

Few specific studies of drought effects on vegetation communities have been conducted, largely because drought is unpredictable and it is a "normal" occurrence. A study measured acorn production (a primary food of many wildlife species) in five oak species occurring at a site in Monterey County from 1980-89 (Koenig et al. 1991). That study determined that 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. That 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) indicate that from 1987-90 production was approximately 60 percent, 20 percent, five percent, and 180 percent, respectively, of the mean annual crop.

Alternatively, in annual vegetation communities, lack of fall germinating rains or minimal spring rains can preclude germination of annual seeds of forbs 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. 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.

Hence, during a drought, some plant species have responded 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).

Native game mammals in California have evolved to withstand both drought and flood extremes within their ranges. Before human intervention, these ranges likely varied as a response to periods of prolonged drought or wet conditions. Currently, however, remaining habitats are, to a large extent, managed and affected by humans. As it relates to drought and water availability, this has produced greater stability in modern wildlife populations due, in part, to the advent of water wells, water sites developed for wildlife (e.g., guzzlers), irrigation, and reservoirs that are adapted to these habitats. Currently, water is more available to wildlife, regardless of drought, than it would have been prior to large-scale human development in California. There are no documented

cases of wildlife being unable to obtain water due to the recent drought. Unlike humans, wildlife do not have to rely on reservoirs for their water supply.

The reduced quantity of vegetative cover due to prolonged drought in some areas could affect thermal and hiding cover important to wildlife. However, that possibility has not yet been reflected in any population data, indicating a significant effect.

Significant impacts due to drought are possible for some species in some areas of the State if drought conditions persist for more than several years. The impact would be expected in the form of reduced habitat quality and quantity, resulting in lowered reproductive success and survival of individuals in the population. As a result, periodic drought conditions may produce short-term effects due to less available forage but may have little, if any, long-term effects on the abundance of most species.

If drought has significant effects on wildlife species, it would be reflected in poorer physical condition of individual animals, decreased survival of individuals, declining production and survival of young, and declining population size. While such trends occur annually with some populations in some areas, the large-scale effects of the current drought, if significant, could be felt statewide. Presently, there are no data to indicate that drought has significantly impacted terrestrial wildlife populations, except in localized areas of southern California.

Effects of drought conditions on elk populations have been recorded in the Owens Valley and in the Cache Creek area (Fowler 1985, Booth et al. 1988, Racine et al. 1988). It should be noted that, while drought may result in increased mortality among individuals in an elk population (primarily lower calf survival), the proposed project was based on data collected on populations that can and do experience periodic drought conditions. The proposed project will not prevent local populations from remaining viable under drought conditions. There are no records of drought affecting the Grizzly Island tule elk herd (Botti and Koch 1988). Based on the above information, and population trends depicted in Figure 1, the possibility of drought impairing the statewide tule elk population is very unlikely.

Evaluation of elk herd performance and habitat conditions and trends is an ongoing facet of the Department's elk management program. Information collected by the Department and other sources will be utilized to modify any future recommendations for hunting proposals or to recommend other management activities, such as habitat improvement or acquisition projects. The impacts, if any, of a catastrophic event on elk populations would be addressed in any future management activities. In addition, the Commission has the regulatory authority (Section 314, FGC) to take emergency action to cancel or suspend one or more proposed elk hunts if a catastrophic event occurred which, in conjunction with a hunting program, could significantly impact the elk population. Thus, the Department does not anticipate that an adverse impact will occur as a result of drought in combination with the proposed project.

Effects of Wildfire

One aspect of prolonged drought that would affect wildlife habitat is an increased risk of wildfire due to extremely dry conditions. However, wildfire can be a problem in extremely wet years because of the buildup of fuel, and it is difficult to conclude that drought years predispose some vegetation communities to wildfire more so than wet years. Certainly in forested communities, prolonged drought that has affected the woody plant community in terms of increased plant mortality and decreased moisture content would make them more susceptible to wildfire.

Catastrophic events, such as wildfires and drought, have been affecting the State's elk resource since their evolution in pristine times. Effects of drought and wildfires can have an impact on local populations of elk. Historical data collected by the Department (McCullough 1969, Fowler 1985, Racine et al. 1988) indicate that there is no evidence that drought, wildfires, or other catastrophic events have resulted in the extirpation of an elk population.

Wildfires are a natural occurrence in elk range. Plant species in the hunt areas have evolved with fire. Many species require fire to reproduce. There is no evidence to indicate that fire has negative long-term effects on elk populations, and there is considerable information that fire can significantly improve elk habitat (Lyon and Ward 1982).

Wildfires have the potential to positively impact a population of elk. The initial fire may displace elk for a very short time period (two to three months). However, elk often return to burned areas immediately following the fire. The long-term impacts can have significant positive effects on the local populations. For example, a wildfire may burn habitat used by elk, causing short-term loss of some forage and cover. However, elk move back into the burned areas quickly to utilize the young nutritious forage growing in the burned areas (Tim Burton, Department of Fish and Game, Yreka). Also, since elk are primarily grazing animals (i.e., they eat mostly grasses), fires which burn brush and trees open areas to allow more grasses to grow, and thus benefit elk (Lyon and Ward 1982).

Based on the above information, the possibility of wildfires impairing the statewide Roosevelt, Rocky Mountain, or tule elk populations from maintaining themselves in a healthy, viable condition is very unlikely. Evaluation of elk herd performance and habitat conditions and trends is an ongoing facet of the Department's elk management program. Information collected by the Department and other sources will be utilized to modify any future recommendations for hunting proposals or to recommend other management activities, such as habitat improvement or acquisition projects. The impacts, if any, of a catastrophic event on elk populations would be addressed in any future management activities. In addition, the Commission has the regulatory authority (Section 314, FGC) to take emergency action to cancel or suspend elk hunting if a

catastrophic event occurred which, in conjunction with a hunting program, could significantly impact the elk population.

Effects of Disease

Historical data indicate that elk are remarkably free of disease (Fowler 1985, Booth et al. 1988, Botti and Koch 1988, and Racine et al. 1988). However, Roosevelt elk tested in the Prairie Creek area of Humboldt County showed signs of heavy parasite levels and poor body condition in 1960 and 1982 (Department of Fish and Game files). The Department routinely collects blood samples from the majority of elk captured. Over the last 20 years, the Department has analyzed approximately 900 tule elk and 200 Roosevelt elk blood samples to systematically determine the prevalence of disease and assess the general health of the State's elk resource.

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 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 900 samples from California deer for CWD. All results to date have been negative. California is considered a low risk state for CWD; 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 animals other than deer and elk. On August 30, 2002, the Fish and Game Commission adopted emergency regulations placing conditions on the importation of hunter-harvested deer and elk into California. These restrictions recently were made permanent, and the Department intends to continue its CWD surveillance program until more is known about this disease.

There is no indication of a potential for the State's elk populations (either statewide or locally) to be significantly impacted by a major disease outbreak. There are no data available to indicate that disease, road kills, predation or other natural mortality factors will act as additive impacts which, along with the proposed hunting program, will have a significant adverse cumulative impact on local or statewide elk populations.

Effects of Habitat Loss and Degradation

The proposed project is not likely to cause habitat loss and degradation. The removal of individuals may actually improve elk habitat by decreasing grazing intensity. The elk hunting season is short, and most of the hunting areas are generally open to the public for other uses year-round. The effects on habitat loss and degradation by hunters during the elk hunting season would be negligible.

On private land, there are potential changes in land ownership which may result in land-use changes. No major changes in private land-use patterns are expected in the near

future. The long-term outlook for elk habitat on public lands in California is stable to improving. The cumulative impacts of habitat modification plus hunting are not expected to have a significant adverse impact on elk populations. In combination with the proposed project, potential habitat modification/ degradation is unlikely to have significant adverse cumulative effects.

Effects of Illegal Harvest

Illegal harvest of game mammals is difficult to quantify. It is likely that elk have been taken illegally from each of the proposed hunt areas, as well as from other herds where hunting is not proposed. Department records indicate at least three citations per year involving illegal take/possession of elk were issued in 1997 and 1998. At least three citations involving elk were issued each year in 2000 and 2001. Illegal harvest of other subspecies of elk has occurred in California and other western states (Potter 1982).

Illegal take of tule elk has occurred in the Owens Valley, at Grizzly Island and Fort Hunter Liggett during recent tule elk seasons. One hunter at Grizzly Island was cited for taking two and one cited for taking a spike elk while possessing an antlerless tag. Similar incidents occurred in sporadically in the past. Such incidents of unintentional illegal take have occurred with other game animals in California and other western states. The Department conducts mandatory hunter orientations for some tule elk hunt sin California and emphasizes avoiding incidents of unintentional illegal take and distributes informational material to all elk tag holders. The Department will continue this emphasis in future orientations; additionally, the Department will continue to issue citations to individuals for illegally taking elk, regardless of whether or not such take is intentional. However, despite such measures, some level of unintentional illegal take is expected to continue.

Effects of Depredation

Private property conflicts involving elk and agricultural crops, fences, and other personal property have occurred, and will continue to occur wherever elk and humans coexist. Section 4181, FGC, provides for the killing of elk when private "property is being damaged or is in danger of being damaged or destroyed." However, current Department policy is to attempt all reasonable and practical means of nonlethal control prior to issuing a depredation permit for elk.

Issuing depredation (kill) permits is considered as the final measure to alleviate localized private property conflicts involving elk; and the Department issued no elk depredation permits from 1989 until 2002. However, as elk population numbers have increased and distribution has expanded, conflicts on private property have increased in severity. Since 2002, the Department has issued approximately fifteen elk depredation permits.

In response to the increasing private property conflicts involving elk, the State Legislature passed Assembly Bill 1420 (AB1420, Laird; Chaptered September 4, 2003). Among other things, AB 1420 directs the Department to prepare a statewide elk management plan that identifies management activities necessary to alleviate private property damage caused by elk. Prior to issuing an elk depredation permit, AB1420 requires the Department to verify damage caused by elk, provide a written summary of corrective measure to alleviate the problem, determine the viability of the subject elk herd and the minimum population numbers needed to sustain it, and finally to ensure that the permit will not reduce the herd below the minimum population level needed.

AB1420 provided some constraints on issuance of elk depredation permits and requires identification of additional management activities to alleviate private property conflicts involving elk. The Department will investigate the potential for expanding hunting opportunities as a measure to alleviate private property conflicts involving elk. Because of the constraints in AB1420, the Department does not anticipate an adverse cumulative impact to elk populations resulting from combined effects of the proposed project and issuance of depredation permits.

Effects of Vehicle-Caused Mortality

The number of elk killed by vehicles is not well documented. Unlike deer, very few elk in California appear to be killed by automobiles each year. Vehicle-caused elk mortalities have been reported (specifically with Roosevelt elk in Del Norte and Humboldt counties and tule elk in the Owens Valley and at Cache Creek) since 1990. Unreported incidents cannot be quantified. However, the Department believes effects of vehicle-caused mortality on statewide and localized elk populations are minimal.

Conclusion

The Department has examined a variety of factors that might affect Roosevelt, Rocky Mountain, and tule elk populations statewide and locally. The Department does not anticipate that adverse cumulative impacts to statewide or local elk populations will occur as a result of the proposed project in combination with any factor discussed. However, if some unforeseen cataclysmic event should occur that threatens the welfare of either statewide elk populations or individual hunted populations, the Commission has the authority to take appropriate action, which may include emergency closure of seasons and/or reduction of future hunting opportunities.

Although hunting elk will result in the death of individual elk, specific safeguards included in the proposed action, such as limited tag quotas, short seasons, bag limits, and close monitoring of hunter activity in the field, will result in removing elk at a level that is below the individual herds' sustained-yield capabilities. Individual elk herds proposed for hunting will be maintained at or above approved management plan objectives, and the estimated statewide tule elk population will remain well above 2,000 animals. Statewide population levels for Roosevelt and Rocky Mountain elk will

remain stable. Therefore, significant adverse effects, individually or cumulatively, to elk populations are not expected to result from the proposed project. Additionally, no impacts from two or more separate factors have been identified where, when viewed alone would be minor, but whose combined effect would be significant. Because individual and cumulative negative impacts are not expected to occur, specific mitigation measures are unnecessary.

CHAPTER 3 - ALTERNATIVES

ALTERNATIVE 1 - NO PROJECT (NO CHANGE)

Other than annual tag quota modifications proposed in response to herd productivity, implementation of the No Project alternative would result in no change from the 2015 elk hunting regulations described in the “Existing Condition” Appendix 17.

ALTERNATIVE 2 – INCREASED HARVEST

Alternative 2 represents management options within each hunt zone that will achieve an increased harvest (IH) from the herd(s). IH 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 for that herd, for at least the next year. A potential problem with an IH management strategy is the risk of overharvesting. If, under an IH program, an overharvest occurred, more conservative management strategies would have to be implemented the following year to correct the situation.

ALTERNATIVE 3 – REDUCED HARVEST

Alternative 3 represents management options within a particular hunt zone that will produce a relatively small harvest. This reduced harvest (RH) is a harvest strategy that provides hunting opportunities at reduced levels from those proposed under either IH or the proposed project strategies.

ALTERNATIVE 4 – HERD GROWTH

Alternative 4 represents management options available if the number of elk increases substantially within the corresponding hunt units. The Herd Growth (HG) scenario would increase the harvest level to correspond with the increase in elk numbers. HG would provide more hunting opportunity correlated directly with elk population levels. Population growth for elk zones were estimated based on the potential for those herds to increase in time. Growth estimates ranged from 18% to 400%. The time frame to reach the herd growth level for the analyzed population under this alternative will vary by herd. This is an alternative harvest that could be utilized within the life span of this environmental document. Current and proposed harvest strategies, for most herds, allow for population growth through time.

BIBLIOGRAPHY

Bakker, E. 1972. An island called California. Univ. of California Press, Berkeley.

Barbour, M.G., and J. Majors, eds. 1977. Terrestrial vegetation of California. John Wiley and Sons, New York.

Barnes, E. P. 1925a. Elk in Del Norte County. California Fish and Game 11:90.

_____. 1925b. A few Roosevelt elk still exist in Del Norte County. California Fish and Game 11:142.

Berbach, M.W. 1991. Activity patterns and range relationships of tule elk and mule deer in Owens Valley. Ph.D. Dissertation, Univ. Calif. Berkeley. 141 pp.

Booth, J., J. Swanson, and D. Koch. 1988. Management plan for the Cache Creek tule elk management unit. California Department of Fish and Game. Sacramento, California.

Botti, F. and D. Koch. 1988. Management plan for the Grizzly Island tule elk management unit. California Department of Fish and Game. Sacramento, California.

Bubenik, A.B. 1982. Physiology. Pp. 125-179 in J. W. Thomas and Dale E. Toweill eds. Elk of North America, ecology and management. Stackpole Books, Harrisburg, PA 698 pp.

Burcham, L.T. 1975. Climate, structure, and history of California's annual grassland ecosystem. Pages 7-14 in R.M. Love, ed. The California annual grassland ecosystem. Univ. of California, Davis, Inst. of Ecology Publ. No. 7.

Clutton-Brock, T.H., F.E. Guiness, and S.D. Albon. 1982. Red deer: behavior and ecology of two sexes. Univ. Chicago Press. 378 pp.

Department of Fish and Game. 2004. Final Environmental Document, Section 364, Title 14, California Code of Regulations, Regarding Elk Hunting. State of California, The Resources Agency, Department of Fish and Game. 300 pp.

deVos, J. C., Jr. And T. McKinney. 2003 Recent trends in North American mountain lion populations: a hypothesis. Pages 297-307 *in* C. van Riper III and D. J. Mattson, editors. The Colorado Plateau II, University of Arizona Press, Tucson.

Fischer, J. and D. Kitchen. 1984. Siskiyou County elk study: final field report 1982-1984. California Department of Fish and Game, 1416 Ninth Street. Sacramento, California 95814.

Fowler, G.S. 1985. Tule elk in California: history, current status, and management recommendations. California Department of Fish and Game, 1416 Ninth Street. Sacramento, California 95814. Interagency Agreement #C-698.

Fredrickson, E., K. M. Havstad, R. Estell, and P. Hyder. 1998. Perspectives on desertification: south-western United States. Journal of Arid Environments 39:191-207.

Geist, V. 1982. Adaptive behavioral strategies. Pp. 219-277 in J. W. Thomas and Dale E. Toweill eds. Elk of North America, ecology and management. Stackpole Books, Harrisburg, PA 698 pp.

Harper, J.A., J.H. Harn, W.W. Bentley, and C.F. Yocom. 1967. The status and ecology of the Roosevelt elk in California. Wildlife Monographs No. 16. Washington D.C. The Wildlife Society. 49 pp.

Hebblewhite, M. 2005. Predation by wolves interacts with the North Pacific Oscillation (NPO) on a western North American elk population. Journal of Animal Ecology 74:226-233.

Hines, W., J. Lemos, and N. Hartmen. 1985. Male breeding efficiency in Roosevelt elk of southwestern Oregon. Wildlife Research Report Number 15. Oregon Department of Fish and Wildlife, P.O. Box 3503, Portland, Oregon 97208.

Hobbs, N.T., and 12 co-authors. 2006. An integrated assessment of the effects of climate change on Rocky Mountain National Park and its gateway community: interactions of multiple stressors. Final Report to the U.S. Environmental Protection Agency http://www.epa.gov/cgi-bin/epaprintonly.cgi.

Kitchen, D.W. and P.M. Woodard. 1995. Seasonal habitat use and herd composition by Roosevelt elk in the Marble Mountains, Siskiyou County, California. Second Report 12 May 1994. 37 pp.

Koenig, W.D., W.J. Carmen, M.T. Stanback, and R.L. Mumme. 1991. In press. Determinants of acorn productivity among five species of oaks in central coastal California. Symposium on California's Oak Woodlands and Hardwood Rangeland.

Lindzey, F.G., W.G. Hepworth, T.A. Mattson and A.F. Reeves 1997. Potential for competition interactions between mule deer and elk in the Western United States and Canada: A Review Wyoming Cooperative Fisheries and Wildlife Research Unit, Laramie, WY. 84pp.

Lyon, J. and L. Ward. 1982. Elk and land management. Pp. 443-477 in J. W. Thomas and Dale E. Toweill (eds.). Elk of North America, ecology and management. Stackpole Books. Harrisburg, Pennsylvania. 698 pp.

McCullough, D.R. 1969. The Tule Elk: Its History, Behavior and Ecology. University of California Publ. in Zoology. No. 88. University of California Press. Berkeley, California. 209 pp.

McCullough, D.R. 1979. The George Reserve deer herd: population ecology of a selected species. Univ. Michigan Press. Ann Arbor. 271 pp.
McCullough, D.R. 1984. Lessons from the George Reserve. Pp. 211-242. in: L. K. Halls (ed.). White-tailed deer: ecology and management. Stackpole Books. Harrisburg, Pennsylvania. 870 pp.

McCullough, D.R. 1984. Lessons from the George Reserve. Pp. 211-242. in: L. K. Halls (ed.). White-tailed deer: ecology and management. Stackpole Books. Harrisburg, Pennsylvania. 870 pp.

Mohler, L. and D.E. Toweill. 1982. Regulated elk populations and hunter harvests. Pp. 561-598 in J. W. Thomas and Dale E. Toweill (eds.). Elk of North America, ecology and management. Stackpole Books. Harrisburg, Pennsylvania. 698 pp.

Munz, P.A. and D.D. Keck. 1973. A California flora with supplement. Univ. of California Press, Berkeley.

Murie, O.J. 1951. The Elk of North America. Wildlife Management Institute/Stackpole Books, Harrisburg, PA. 376 pp.

Nelson, J. and T.A. Leege. 1982. Nutritional requirements and food habits. Pp. 323-368 in J. W. Thomas and Dale E. Toweill (eds.). Elk of North America, ecology and management. Stackpole Books. Harrisburg, Pennsylvania. 698 pp.

Oruduff, R. 1974. Introduction to California plant life. Univ. of California Press, Berkeley.

Potter, D.R. 1982. Recreational use of elk. Pp. 509-559 in J.W. Thomas and D.G Toweill eds. Elk of North America, ecology and management. Stackpole Books. Harrisburg, PA. 698 p.

Racine, D., T. Blankinship, and D. Koch. 1988. Management plan for the Owens Valley tule elk management unit. California Department of Fish and Game. Sacramento, California.

Ricker, W.E. 1954. Stock and Recruitment. J. Fish. Res. Board Can. 11:559-623.

Savidge, I.R. and J.S. Ziesenis. 1980. Sustained yield Management. Pp. 405-410 in Sanford D. Schemnitz (ed.). Wildlife Management Techniques Manual. The Wildlife Society. Washington, D.C. 686 pp.

Smith, D. and D. Updike. 1987. Elk Pop, unpublished computer population simulation model. Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814.

Taber, R.D., K. Raedeke, and D.A. McCaughran. 1982. Population characteristics. Pp. 279-300 in J. W. Thomas and Dale E. Toweill (eds.). Elk of North America, ecology and management. Stackpole Books. Harrisburg, Pennsylvania. 698 pp.

Thomas, R. D. 1975. The status of Rocky Mountain Elk in Kern County, 1974. California Fish and Game 61 (4): 239-241.

Walters, C.J. 1986. Adaptive management of renewable resources. MacMillian Publishing Company, New York, NY. 300 pp.

Williams, E.S., M.W. Miller, T.J. Kreeger, R.H. Kahn, and E.T. Thorne. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. Journal of Wildlife Management, 66(3): 551-563.

Appendix 1 – 2014 Elk Tags Issued and Harvested on PLM Ranches

PLM Name	Bull Tags	Bulls Harvested	Antlerless Tags	Antlerless Harvest
ALEXANDER RANCH	1	1	2	2
AVENALES RANCH	2	2	2	2
BARDIN RANCH	2	2	4	4
BLACK RANCH	1	0	1	1
CAMP 5 OUTFITTERS (MORISOLI)	3	3	3	3
CARNAZA WILDLIFE MGT AREA	3	3	3	1
CARRIZO RANCH	2	2	2	2
CHIMNEY ROCK RANCH	2	2		
CLARK AND WHITE RANCH	3	3	2	0
CONNOLLY/CORRAL HOLLOW RANCH	1	0	1	0
COTTRELL RANCH	1	0	1	1
DEFRANCESCO AND EATON	2	2	1	1
EDEN VALLEY RANCH	8	2	7	2
FULTON RANCH	1	1		
GABILAN RANCH	1	1		
HARTNELL RANCH	1	0	2	2
HEARST RANCH	6	2	6	0
HUNTER RANCH	1	1		
INDIAN VALLEY CATTLE CO.	3	3	2	2
ISABEL VALLEY RANCH	1	1		
JS RANCH	1	1		
LEWIS RANCH	1	1	1	1
LONE RANCH	3	2	2	0
MILLER-ERIKSEN RANCH	1	0		
PBM FARMS	1	0		
PEACHTREE RANCH	4	4	2	2
POTTER VALLEY WMA	2	2	10	10
RANCHO LA CUESTA	4	4	1	0
REDWOOD HOUSE RANCH	1	1		
ROOSTER COMB RANCH	2	0		
ROSEBERG RESOURCES PONDOSA	2	2	2	2
R-R RANCH	3		6	
SHAMROCK RANCH	7	6	5	5
SLICK ROCK RANCH	1	1		
SMITH RIVER	3	3		
SPRING VALLEY RANCH	4	3		
STOVER RANCH	4	2	2	1
SUMMER CAMP RANCH	1	0		
SWEETWATER RANCH	1	1		
TEJON RANCH	12	9	3	1
TEMBLOR WMA	7	7	12	7
TRINCHERO RANCH	2	0		
WIGGINS RANCH	2	2	2	2
WORK RANCH	2	0		
TOTALS	**116**	**82**	**87**	**54**

Appendix 2 - 2016 Proposed Elk Tag General Hunt Tag Quota Ranges

2016 Proposed Elk Tag Allocation [shown in ranges]				
Elk	**Bull**	**Antlerless**	**Either-Sex**	**Spike**
General Roosevelt Elk Hunts				
Siskiyou Period 1	0-40	0-40		
Siskiyou Period 2	0-10	0-40		
Siskiyou Period 3	0-5	0-20		
Del Norte Period 1	0-15	0-25	0-10	
Del Norte Period 2	0-15	0-25	0-10	
Del Norte Period 3	0-15	0-25	0-10	
Del Norte Period 4	0-15	0-25	0-10	
Del Norte Period 5	0-15	0-25	0-10	
Humboldt Period 1	0-20	0-50	0-10	
Humboldt Period 2	0-20	0-50	0-10	
Humboldt Period 3	0-20	0-50	0-10	
Humboldt Period 4	0-20	0-50	0-10	
Humboldt Period 5	0-20	0-50	0-10	
Marble Mountain North Period 1	0-50	0-20		
Marble Mountain North Period 2	0-10	0-40		
Marble Mountain North Period 3	0-5	0-15		
Marble Mountain South Period 1	0-50	0-20		
Marble Mountain South period 2	0-10	0-40		
Marble Mountain South Period 3	0-5	0-15		
General Rocky Mountain Elk Hunts				
Northeastern California	0-30	0-20		
General Roosevelt/Tule Elk Hunts				
Mendocino North Coast	0-10	0-40		
Mendocino Middle Fork	0-10	0-40		
Mendocino Upper Russian River	0-10	0-40		
Mendocino Little Lake	0-5	0-10		
Mendocino South Coast	0-5	0-10		
General Tule Elk Hunts				
Cache Creek	0-10	0-10		
La Panza Period 1	0-20	0-30		
La Panza Period 2	0-20	0-30		
Bishop Period 3	0-10	0-30		
Bishop Period 4	0-10	0-30		
Bishop Period 5	0-10	0-30		
Independence Period 2	0-10	0-30		
Independence Period 3	0-10	0-30		
Independence Period 4	0-10	0-30		
Independence Period 5	0-10	0-30		
Lone Pine Period 2	0-10	0-30		
Lone Pine Period 3	0-10	0-30		
Lone Pine Period 4	0-10	0-30		
Lone Pine Period 5	0-10	0-30		
Tinemaha Period 2	0-10	0-30		
Tinemaha Period 3	0-10	0-30		
Tinemaha Period 4	0-10	0-30		
Tinemaha Period 5	0-10	0-30		
West Tinemaha Period 1	0-10	0-30		
West Tinemaha Period 2	0-10	0-30		
West Tinemaha Period 3	0-10	0-30		
West Tinemaha Period 4	0-10	0-30		
West Tinemaha Period 5	0-10	0-30		

2016 Proposed Elk Tag Allocation [shown in ranges]				
Elk	**Bull**	**Antlerless**	**Either-Sex**	**Spike**
Tinemaha Mountain Period 1	0-8			
Tinemaha Mountain Period 2	0-8			
Tinemaha Mountain Period 3	0-8			
Tinemaha Mountain Period 4	0-8			
Tinemaha Mountain Period 5	0-8			
Whitney Period 2	0-4	0-10		
Whitney Period 3	0-4	0-10		
Whitney Period 4	0-4	0-10		
Whitney Period 5	0-4	0-10		
Goodale Period 1	0-10	0-10		
Goodale Period 2	0-10	0-10		
Goodale Period 3	0-10	0-10		
Goodale Period 4	0-10	0-10		
Goodale Period 5	0-10	0-10		
Grizzly Island Period 1	0-3	0-12		0-10
Grizzly Island Period 2	0-3	0-12		0-10
Grizzly Island Period 3	0-3	0-12		0-10
Grizzly Island Period 4	0-3	0-12		0-10
Grizzly Island Period 5	0-3	0-12		0-10
Grizzly Island Period 6	0-3	0-12		0-10
Grizzly Island Period 7	0-3	0-12		0-10
Grizzly Island Period 8	0-3	0-12		0-10
Grizzly Island Period 9	0-3	0-12		0-10
Grizzly Island Period 10	0-3	0-12		0-10
Grizzly Island Period 11	0-3	0-12		0-10
Grizzly Island Period 12	0-3	0-12		0-10
Grizzly Island Period 13	0-3	0-12		0-10
Fort Hunter Liggett Central Coast Period 1	0-14	0-16		
Fort Hunter Liggett Central Coast Period 2	0-14	0-16		
Fort Hunter Liggett Central Coast Period 3	0-14	0-14		
East Park Reservoir	0-6	0-20		
San Luis Reservoir Period 1	0-10	0-20	0-10	
San Luis Reservoir Period 2	0-10	0-20	0-10	
San Luis Reservoir Period 3	0-10	0-20	0-10	
Bear Valley	0-10	0-10		
Lake Pillsbury Period 1	0-10	0-10		
Lake Pillsbury Period 2	0-10	0-10		
Lake Pillsbury Period 3	0-10	0-10		
Santa Clara	0-15	0-20		
Alameda	0-4	0-10		
San Emigdio Mountain	0-15	0-40		
Camp Roberts Period 1	0-10	0-20		
Camp Roberts Period 2	0-10	0-20		
Camp Roberts Period 3	0-10	0-20		
Apprentice Hunts				
Siskiyou			0-2	
Marble Mountains North			0-4	
Marble Mountains South			0-4	
Northeastern CA			0-4	
Cache Creek	0-2	0-2		
La Panza Period 1	0-2	0-2		
Bishop Period 2	0-10	0-30		
Grizzly Island Period 1		0-4		0-4
Grizzly Island Period 2		0-4		0-4
Grizzly Island Period 3		0-4		0-4
Grizzly Island Period 4		0-4		0-4

2016 Proposed Elk Tag Allocation [shown in ranges]				
Elk	**Bull**	**Antlerless**	**Either-Sex**	**Spike**
Fort Hunter Liggett Central Coast	0-2	0-8		
Archery Only Hunts				
Northeastern California Archery Only	0-10	0-10	0-20	
Owens Valley Multiple Zone Archery Only	0-10	0-10		
Lone Pine Archery Only Period 1	0-10	0-30		
Tinemaha Archery Only Period 1	0-10	0-30		
Whitney Archery Only Period 1	0-10	0-30		
Goodale Period 1	0-10	0-10		
Fort Hunter Liggett Central Coast Archery Only		0-10	0-10	
Muzzleloader Only Hunts				
Bishop Muzzleloader Only Period 1	0-10	0-30		
Independence Muzzleloader Only Period 1	0-10	0-10		
Goodale Period 1	0-10	0-10		
Fort Hunter Liggett Central Coast Muzzleloader Only	0-6	0-10		
Muzzleloader/Archery Only Hunts				
Siskiyou			0-20	
Marble Mountain North			0-20	
Marble Mountain South			0-20	
Fund Raising Tags				
Multi-zone	1			
Grizzly Island	1			
Owens Valley	1			
Military Only Elk Tags				
Fort Hunter Liggett Military Early Season	0-2	0-2		
Fort Hunter Liggett Military Period 1		0-16		
Fort Hunter Liggett Military Period 2		0-14		
Fort Hunter Liggett Military Period 3	0-14			
Camp Roberts Military Only Period 1	0-10	0-20		
Camp Roberts Military Only Period 2	0-10	0-20		
Camp Roberts Military Only Period 3	0-10	0-20		
Fort Hunter Liggett Military Apprentice	0-2	0-8		
Fort Hunter Liggett Military Archery Only		0-10	0-6	
Fort Hunter Liggett Military Muzzleloader Only	0-6			
Elk SHARE Hunts				
SHARE Roosevelt Elk Hunts				
Siskiyou	0-55	0-100		
Del Norte	0-25	0-100	0-50	
Humboldt	0-25	0-100	0-50	
Marble Mountain North	0-20	0-25		
Marble Mountain South	0-20	0-25		
SHARE Rocky Mountain Elk Hunts				
Northeastern California	0-20	0-20		
SHARE Roosevelt/Tule Elk Hunts				
Mendocino North Coast	0-10	0-40		
Mendocino Middle Fork	0-10	0-40		
Mendocino Upper Russian River	0-10	0-40		
Mendocino Little Lake	0-1	0-5		
Mendocino South Coast	0-5	0-10		
SHARE Tule Elk Hunts				
Cache Creek	0-10	0-10		
La Panza	0-40	0-60		
Bishop	0-10	0-30		
Independence	0-10	0-30		
Lone Pine	0-40	0-30		
Tinemaha	0-10	0-30		

2016 Proposed Elk Tag Allocation [shown in ranges]				
Elk	**Bull**	**Antlerless**	**Either-Sex**	**Spike**
West Tinemaha	0-10	0-30		
Tinemaha Mountain	0-8			
Whitney	0-4	0-10		
Goodale	0-10	0-10		
Grizzly Island	0-2	0-50		0-50
Fort Hunter Liggett Central Coast	0-42	0-44		
East Park Reservoir	0-6	0-20		
San Luis Reservoir	0-30	0-30		
Bear Valley	0-10	0-10		
Lake Pillsbury	0-10	0-10		
Santa Clara	0-4	0-20		
Alameda	0-4	0-10		
San Emigdio	0-15	0-20		
Camp Roberts	0-10	0-20		

Appendix 3– Scoping Summary - Notice of Preparation Documents

This section summarizes the range of scoping comments received through the scoping period. These comments raised issues that will be taken into consideration by CDFW and the Commission in preparation of the Draft ED. The summary of comments presented in this section is organized by date received. This organization does not represent the relative importance among comments or topic areas, but rather is intended to facilitate presentation of comments in an orderly manner.

Scoping Meeting

CDFW conducted one scoping meeting, held from 1:00 P.M. to 3:00 P.M. on Wednesday, August 26, 2015 at CDFW's Wildlife Branch located at 1812 9th Street, Sacramento CA 95811. The meeting was intended to solicit input from the public and interested public agencies regarding the nature and scope of the environmental impacts to be addressed in the Draft Environmental Document (Draft ED). At the beginning of the meeting, staff made a brief presentation in order to provide an overview of the existing program, the legal background leading to this Draft ED, the objectives and range of information to be included in the Program, and the CEQA process generally. During the scoping meeting, participants also were encouraged to submit written comments, or to submit additional comments by mail or email before close of the comment period on September 15, 2015. Approximately 6 members of the public attended the scoping meeting.

Oral Comments

Attendees:

Name	Affiliation	Email	Phone
Joe Hobbs	CDFW	Joe.hobbs@wildlife.ca.gov	(916) 445-9992
Regina Abella	CDFW	Regina.abella@wildlife.ca.gov	(916) 445-3728
Roy Griffith	CDFW	Roy.griffith@wildlife.ca.gov	(916) 653-1093
Chris Howard	Del Norte County	Choward@co.del-norte.ca.us	
Phil Martinelli	RMEF	pmartinelli@rmef.org	(925) 708-4724
Robert Moore	California Bowmen Hunters	MooreRobt@surewest.net	(916) 531-1281
Bill Gaines	Gaines and Associates	bill@gainesandassociates.net	(916) 337-9031
Clark Blanchard	CDFW	Clark.blanchard@wildlife.ca.gov	
Gary Ryueuson	Green Diamond	gryueauson@greendiamond.com	(707) 496-1941
DJ Sambucetti	RMEF	djbackhoe@netzero.net	(530) 681-0804
Eric Loft	CDFW	Eric.loft@wildlife.ca.gov	

Topics discussed include:

- Status of elk management plan;
- Timing of commission process for tag quotas;

- How/why hunts are created and their tag quotas/seasons developed;
- Wolf predation and their impacts on elk populations;
- Hunting impacts on small populations;
- Hunting impacts from harvesting adult males;
- Drought impacts;
- Population trends;
- Process and timing of document approval;
- Depredation;
- Landowner, PLM, SHARE tags – how allocated?

Written Comments Received During 30-Day Comment Period

In total, 14 written comments from 12 unique individuals were received through the scoping process. This included a total of 6 hard copy letters (from 6 unique individuals) and 8 emails (from 6 unique individuals). A single letter or email often contained more than one scoping-related comment; these have been separated out and grouped accordingly.

The vast majority of comments included recommendations for increasing elk hunting opportunities. 5 of the 6 hard copy letters included recommendations for more tags, extended seasons, and the creation of new hunt areas. All 8 of the emails received included similar recommendations.

1 hard copy letter agreed with the Department's "Less than Significant" finding regarding Biological Resource impacts.

1 hard copy letter requested completion of the statewide elk management plan before changes to the current elk hunting program were implemented. The letter also requests a more detailed explanation of quota development processes, closing hunting in certain areas for "population recovery", non-consumptive uses, and drought relief. The letter also requests an explanation on population level effects of annually removing "primary" bulls through hunting.

1 email recommends more cooperation among state and federal agencies to manage elk according to habitat suitability and conditions. This same email suggests elk be managed as a "public safety hazard" due to increasing populations and disease they may carry.

1 email recommends creation of wildlife corridors to ensure long-term survivability of the species.

Note: No comments were received that pertained directly to Aesthetics, Agriculture and Forestry Resources, Air Quality, Cultural Resources, Geology/Soils, Greenhouse Gas Emissions, Land Use/Planning, Mineral Resources, Noise, Population/Housing, Public Services, Recreation, Transportation/Traffic, or Utilities/Service Systems.

Attachment #1

Project Description

The project involves elk hunting for 2016 (Section 332, Fish and Game Code). Specifically, the Department of Fish and Wildlife is proposing to adjust tag quotas On existing elk hunts, establish new hunt zones, modify season dates, modify existing hunt boundaries, add additional hunts within existing zones, and modify existing hunts.

Existing law (Section 3950, Fish and Game Code) designates elk (genus *Cervus*) as a game mammal in California. Section 332, Fish and Game Code, provides that the Commission may fix the area or areas, seasons and hours, bag and possession limit, sex, and total number of elk that may be taken pursuant to its regulations. Section 203.1, Fish and Game Code, requires the Commission to consider populations, habitat, food supplies, the welfare of individual animals, and other pertinent facts when establishing hunting regulations for elk.

State law (Section 207 of the Fish and Game Code) requires the Fish and Game Commission (Commission) to review mammal hunting regulations and the Department of Fish and Game (Department) to present recommendations for changes to the mammal hunting regulations to the Commission at a public meeting. Mammal hunting regulations adopted by the Commission provide for hunting elk in specific areas of the State [Section 364 and 364.1, Title 14, California Code of Regulations (CCR)].

Print Form

Appendix G

Environmental Checklist Form

NOTE: The following is a sample form and may be tailored to satisfy individual agencies' needs and project circumstances. It may be used to meet the requirements for an initial study when the criteria set forth in CEQA Guidelines have been met. Substantial evidence of potential impacts that are not listed on this form must also be considered. The sample questions in this form are intended to encourage thoughtful assessment of impacts, and do not necessarily represent thresholds of significance.

1. Project title: Elk Hunting

2. Lead agency name and address:
California Fish and Game Commission
1416 9th Street
Sacramento, CA 95814

3. Contact person and phone number: Eric Loft, Chief, Wildlife Branch - (916) 445-3555

4. Project location: Statewide

5. Project sponsor's name and address:
California Department of Fish and Wildlife
Wildlife Branch, 1812 9th Street
Sacramento, CA 95811

6. General plan designation: N/A

7. Zoning: N/A

8. Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)
See attachment #1

9. Surrounding land uses and setting: Briefly describe the project's surroundings:
The project occurs on wildlands in California that are open to elk hunting.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)
N/A

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☐ Cultural Resources	☐ Geology /Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality
☐ Land Use / Planning	☐ Mineral Resources	☐ Noise
☐ Population / Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities / Service Systems	☒ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Signature Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a) Earlier Analysis Used. Identify and state where they are available for review.

    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

    a) the significance criteria or threshold, if any, used to evaluate each question; and

    b) the mitigation measure identified, if any, to reduce the impact to less than significance.

SAMPLE QUESTION
Issues:

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒
II. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Production (as defined by Government Code section 51104(g))?				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
de) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☒
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
VII. GREENHOUSE GAS EMISSIONS -- Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒
VIII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
for people residing or working in the project area?				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
IX. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
X. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
XI. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒
XII. NOISE -- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
XIII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
XIV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒
XV. RECREATION --				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
XVI. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒
XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
could cause significant environmental effects?				
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE --				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Note: Authority cited: Sections 21083, 21083.05, Public Resources Code. Reference: Section 65088.4, Gov. Code; Sections 21080, 21083.05, 21095, Pub. Resources Code; *Eureka Citizens for Responsible Govt. v. City of Eureka* (2007) 147 Cal.App.4th 357; *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th at 1109; *San Franciscans Upholding the Downtown Plan v. City and County of San Francisco* (2002) 102 Cal.App.4th 656.

Revised 2009

Attachment #2

Elk Hunting – Initial Study

Impact Significance Analysis

Less Than Significant Impact

1. IV. Biological Resources. Less than significant impacts may occur for elk populations within hunting zones if harvest rates are exceedingly high in comparison to population levels, recruitment rates, other sources of mortality, and management unit objectives. The goal of California's elk program is to sustain or increase elk populations and ensure they are managed within habitat capabilities and in consideration of other land uses. Maintain healthy and productive elk populations that contribute to ecosystem functions. Continue to provide use and enjoyment of elk by the general public while conserving and enhancing elk habitat throughout the state.

2. XVIII Mandatory Findings of Significance. Less than significant impacts may occur for elk populations within hunting zones if harvest rates are exceedingly high in comparison to population levels, recruitment rates, other sources of mortality, and management unit objectives. The goal of California's elk program is to sustain or increase elk populations and ensure they are managed within habitat capabilities and in consideration of other land uses. Maintain healthy and productive elk populations that contribute to ecosystem functions. Continue to provide use and enjoyment of elk by the general public while conserving and enhancing elk habitat throughout the state. Harvest strategies use the best available population information as well as the previously stated goals and objectives to establish appropriate tag ranges and seasons. The elk program utilizes adaptive management as part of its overall elk management strategies. Adaptive management is a flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives. An adaptive management approach provides a structured process that allows for taking action under uncertain conditions based on the best available science, closely monitoring and evaluating outcomes, and re-evaluating and adjusting decisions as more information is learned. Previous, current, and future harvest rates have been and continue to be managed not to reduce populations below the ability to be self-sustaining.

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Director's Office
1416 Ninth Street, 12th Floor
Sacramento, CA 95814
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

August 11, 2015

NOTICE OF PUBLIC SCOPING MEETING

To Whom It May Concern:

The California Department of Fish and Wildlife (CDFW) is preparing a draft environmental document to address potential impacts resulting from the implementation of elk hunting regulations. Pursuant to CEQA Guidelines Section 15082 (c), a public scoping meeting will be held to identify potentially significant effects on the environment that may result from the proposed regulations, as well as any feasible mitigation measures that should be addressed in the draft environmental document. CDFW has prepared an Initial Study and Notice of Preparation for the proposed action. These documents can be accessed on our web page at:

https://www.wildlife.ca.gov/Notices

The scoping meeting is scheduled from 1:00 P.M. to 3:00 P.M. on Wednesday August 26, 2015 at CDFW's Wildlife Branch located at 1812 9th Street, Sacramento, CA 95811. If you are unable to attend the meeting, comments may be provided by e-mail to Joe Hobbs (joe.hobbs@wildlife.ca.gov) or by letter to the following address:

Attn: Joe Hobbs
California Department of Fish and Wildlife
1812 9th Street
Sacramento, CA 95811

From: Pat Fitzmorris [mailto:patf@caldeer.org]
Sent: Tuesday, August 18, 2015 5:34 AM
To: Hobbs, Joe@Wildlife; 'Mike Ford (MFord@RMEF.ORG)'; 'Bill Gaines'; Robert Moore (moorerobt@surewest.net); wraupe@gmail.com; Jay Sarina (jsarina@co.del-norte.ca.us)
Cc: Roman Porter; randy@muledeer.org; NvaGvUp@aol.com; Rich Klug (RichK@rfpco.com); Holly Gallagher (hgallagher@countyofcolusa.org); cemodoc@ucdavis.edu
Subject: Re: Elk Scoping Session

Hi Joe,

Any chance for more youth elk tags? For the state, there are 14 youth and 294 general tags (combined all; antlerless, bull, archery, muzzleloader). Seems that a lot more opportunity could be offered for youth hunters.

Thank you,

Pat Fitzmorris
Senior Field Director
Northern California Region
CA Deer Association
patf@caldeer.org
1431 N. Market Blvd., #1
Sacramento, CA 95834
office: 916-575-7745
cell: 530-632-2091
http://www.caldeer.org

From: Rick Copeland [mailto:rcopeland@wildernessunlimited.com]
Sent: Tuesday, August 25, 2015 2:42 PM
To: Hobbs, Joe@Wildlife
Cc: Stowers, Craig@Wildlife; Yparraguirre, Dan@Wildlife; Loft, Eric@Wildlife
Subject: Fwd: CDFW Plans Public Meeting On Proposed Elk Hunting Regulations

Joe et all

This press release has me somewhat on my heels. Received today August 25 at 2pm with a notice of a meeting being held ***Wednesday August 26*** from 1-3. Would be hard to make that one if it is today. The point is even if the meeting is tomorrow, Thursday the 26th, my assumption, that is pretty late notice.

Enough whining. The point is, having read the attachments, this pretty much looks like you are just starting the process?

I would like to be on the list in the future re: this topic especially RE current Mendocino hunt 327/328

Wilderness Unlimited (WU) manages about 80,000 acres of forest/ranch land in Mendocino County that have elk on them, a lot.

The Mendocino tag has had a tag allotment of 2 bulls and 2 cows per year since its inception.

Roosevelt's on the coast and Tule's in Potter Valley, that both happen to fall into the same tag zone. Maybe that is odd and up for review?

I don't feel we need to enter SHARE or PLM to manage this as we are already allowing public access now. Albeit members of WU, but still hunter opportunity. All the land owners (4 separate as of now) are willing to work with us on this. We are willing to promote the Mendo hunt and take are chances with the draw as we did this year, A WU member drawing one this year. The question for him is, does he chase the 8x Roose or the 7x Tule (As of today)

Are you reviewing changes regarding this hunt zone?

Thoughts?

Rick Copeland

Rick Copeland
CEO-Editor
Wilderness Unlimited
rcopeland@wildernessunlimited.com

From: Rick Copeland [rcopeland@wildernessunlimited.com]
Sent: Tuesday, August 25, 2015 2:57 PM
To: Hobbs, Joe@Wildlife
Subject: Re: CDFW Plans Public Meeting On Proposed Elk Hunting Regulations

Thanks Joe

Just suggesting that you consider authorizing more tags for the Menodcino hunt or

split the hunt on 101 east and 101 west maybe and still authorize more tags in both.

They herds in Mendocino are different species and both doing well.

I don't think the solution should be to just give all additional tags to SHARE.

Rick Copeland

Rick Copeland
CEO-Editor
Wilderness Unlimited
rcopeland@wildernessunlimited.com

CENTER for BIOLOGICAL DIVERSITY Because life is good.

August 26, 2015

Sent via Email

Attn: Joe Hobbs
California Department of Fish and Wildlife
1812 9th Street
Sacramento, CA 95811

Re: Scoping on Implementation of Elk Hunting Regulations

Dear Mr. Hobbs:

On behalf of the Center for Biological Diversity, I submit these scoping comments on potential impacts resulting from the implementation of elk hunting regulations. The Center is a national, nonprofit organization with over 900,000 members and online activists whose mission is to protect and restore rare animals and their habitats through science, policy, education, advocacy, and environmental law. The Center is concerned about how implementation of the elk hunting regulations will affect elk recovery in California.

We understand that the Department of Fish and Wildlife is proposing to adjust tag quotas on existing elk hunts, establish new hunt zones, modify season dates and existing hunt boundaries, and add additional hunts within existing zones. We ask that the Department address the following issues in the draft environmental document.

To begin, we are concerned about the Department's failure to first finalize a statewide elk management plan, as the statute has long required. Section 3952 of the Fish and Game Code provides:

> The department shall develop a statewide elk management plan, consistent with the state's wildlife policy as set forth in Section 1801. The statewide elk management plan shall emphasize maintaining sufficient elk populations in perpetuity, while considering all of the following:
>
> (a) Characteristics and geographic range of each elk subspecies within the state, including Roosevelt elk, Rocky Mountain elk, and tule elk.
> (b) Habitat conditions and trends within the state.
> (c) Major factors affecting elk within the state, including, but not limited to, conflicts with other land uses.
> (d) Management activities necessary to achieve the goals of the plan and to alleviate property damage.
> (e) Identification of high priority areas for elk management.

(f) Methods for determining population viability and the minimum population level needed to sustain local herds.
(g) Description of the necessary contents for individual herd management plans prepared for high priority areas.

A statewide elk management plan would inform the Department's elk hunting regulations. For example, the required management plan must consider "population viability and the minimum population level needed to sustain local herds." Such information is necessary before making any upward adjustment in existing elk quotas or opening up new areas to elk hunting.

Moreover, Section 3951 of the California Fish and Game Code provides that any hunting of tule elk must be "in accordance with the statewide elk management plan developed pursuant to Section 3952." Without such a management plan, the Department should not be authorizing the killing of these rare elk. Although much progress toward recovery has been made in the last 50 years, the statewide tule elk population is still just a fraction of its historical numbers. Indeed, scientists estimate that approximately half a million tule elk once roamed California, while today the Department in 2007 estimated the population at approximately 3800 elk in 21 herds.[1] Furthermore, the population has likely declined since then because of the drought; this past year 250 tule elk perished in just one herd at Point Reyes National Seashore.

We are concerned that the Department is moving forward with increased hunting of small elk herds without adequate information on population status and trends. The 2015 Final Elk Quota[2] allocates tags for more than 350 elk, too often from herds with small numbers, and even for some small herds with demonstrated declining populations. In its environmental analysis, the Department should explain how it determined the quota for each herd and document whether such level of hunting is consistent with the state's goal of "maintaining sufficient elk populations in perpetuity."

It is our understanding that (during seasons open to targeting of bulls) hunters usually seek the largest elk they can shoot, preferably one of the large "primary bulls," which are responsible for most of the breeding. The Department needs to consider the impact of shooting the largest elk on population dynamics and whether each herd has adequate numbers to support the annual killing of primary bulls.

California's elk face many threats, particularly habitat loss, extended drought, and impacts from being hemmed in by urban development. Without sound and clearly-defined management policies, cumulative impacts from hunting could impede elk recovery or even cause permanent declines in the population. As such, we ask that the Department consider closing certain existing elk hunting areas based on the following considerations: promoting elk recovery, providing opportunities for non-consumptive wildlife uses such as photography and wildlife watching, and mitigating for impacts from California's severe drought.

[1] http://www.dfg.ca.gov/wildlife/hunting/elk/tule/about/distribution.html
[2] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=95629&inline

California's elk must be considered a public resource for everyone to enjoy, not just hunters. We ask that the Department not make any increases to the number of elk that can be killed until elk population numbers can be thoroughly analyzed in conjunction with a statewide elk management plan. Our concern here is with recovering elk in California through sound wildlife management driven by science.

Sincerely,

Collette Adkins, Senior Attorney
8640 Coral Sea Street Northeast
Minneapolis, MN 55449
651-955-3821
cadkins@biologicaldiversity.org

ROCKY MOUNTAIN ELK FOUNDATION

Joe Hobbs
California Department of Fish and Wildlife
1812 9th Street
Sacramento, CA 95811

August 26, 2015

RE: Scoping Comments, Draft Environmental Document to address potential impacts resulting from the implementation of Elk Hunting Regulations

The Elk Foundation has long believed that ***Hunting is Conservation***. Regulated hunting is a tremendous management tool that provides family recreational opportunities, generates an income source that helps to fund elk management programs, and allows the state to manage for larger and healthier elk populations. The recovery of Tule elk populations from the brink of extinction is in part a hunter driven success story for example. Today affording a recreational viewing and hunting opportunity while managing to expand herd numbers and move Tule elk into historic areas, paid for by hunters.

Based on the Departments recent estimates of elk population numbers, it is clear that existing hunting levels have not adversely impacted the elk populations in any way. In fact the dollars generated from the sale of licenses and tags has generated a funding source for many Department management programs and to fund many habitat restoration projects.

The Department has shown in previous documents that most of California's Elk Management Units are in fact below management objectives and that there are areas where elk historically resided, but do not today. Available elk habitat exists that is not currently being occupied. Only in very local areas are elk population numbers creating issues and we believe that those issues can be dealt with thru public hunting opportunities.

With the Department's most recent estimate of increased elk populations across the state, and potentially new management options that may become available as a result of this assessment, there are a number of management actions pertaining to elk hunting that we would recommend that you consider.

The Elk Foundation would strongly advocate for an increase in ***public hunting opportunity*** anywhere within the state that elk populations have increased sufficiently to warrant those increases and where additional hunting opportunity is consistent with the goals of the Elk Management Units (EMU). In addition we would advocate that the Department look to be more aggressive in providing public elk hunting opportunities than in previous years.

K. Mike Ford I Sr. Regional Director I Rocky Mountain Elk Foundation
P.O. Box 1501 | Yreka, CA 96097 | (530) 842-2021 | mford@rmef.org

The ***Private Land Management (PLM)*** hunt program is a desirable program to help incentive private land owners to improve elk habitat on their property and to protect the high quality habitat that may currently exist on private lands. However, public tags should be the Departments primary management tool to manage and control elk populations. The North American Hunting Model has worked for the US for many years, partially because hunting is a public opportunity. Issuing PLM tags are a tool that could be used, but in moderation, so that we do not move to a European model of hunting where only larger landowners have hunting opportunity. Therefor we do not think that the number of available PLM tags should be increased from their current cap.

Moving forward we would also advocate that the number of elk tags issued to private land owners under the PLM program be standardized much better across the state. At the current time the level of proposed habitat improvement, the size and quality of available habitat owned by the individual, and the number of tags issued are extremely inconsistent. It would be desirable within this document to provide specific direction that helps to standardize the number of PLM tags issued under this program.

The ***555 Program*** developed by the Department has helped private landowners gain some opportunities based on elk use of their properties. This program should be kept at its current level.

Hunting opportunities for individual ***special interest groups*** should be considered, especially if it provides additional public hunting opportunities. If establishing these special hunt opportunities reduces the number of general season public hunt tags the Department should look closely at the value of these hunts. Unfortunately California has a limited elk resource and hunt tags are premium items. Currently 25% of the tags are available thru the general draw, 75% being preference point dependent. All Californians should have access to these tags. Hunts aimed at mentoring young hunters should be considered above other special interest hunts.

We believe that ***depredation permits*** should be minimized in favor of providing for public hunting opportunities to manage the local elk herds.

K. Mike Ford I Sr. Regional Director I Rocky Mountain Elk Foundation
P.O. Box 1501 | Yreka, CA 96097 | (530) 842-2021 | mford@rmef.org

Specific EMU suggestions:

Marble Mountain Elk Management Unit

We believe that Marble Mountain EMU should be divided into 2 separate hunt units – This would afford the Department better control over the harvest of elk within sub herds in the larger EMU. It would also allow for the Department to distribute recreational use within the EMU. The division of the EMU into two hunt units, along with an increase in the estimated elk population should allow for additional public tags to be issued.

The Elk Foundation would like to see an increase in the number of elk tags available for public hunting – The Department has recently estimated that there are more elk within the Marble Mountain EMU that previously thought. Consistent with this estimate of additional elk within the unit, additional public tags should be issued consistent with the EMU goals.

The Elk Foundation would like for the Department to consider moving the hunt period later in the year – If the Department were to split the existing unit into two different hunt zones, the hunt zone that included the Marble Mountain Wilderness Area could have a later hunt period than the Trinity County zone. A later hunt period would be desirable given the type of wilderness hunt that this unit provides and the difficulty with proper care of the animal after harvest. Currently the daytime temperatures and distance to cold storage tends to result in spoiled meat.

NE Elk Management Unit

The Elk Foundation would recommend splitting the existing EMU into 2 separate hunt units – This would afford the Department better control over the harvest of elk within sub herds in the larger EMU. It would also allow for the Department to distribute recreational use within the EMU. The division of the EMU into two hunt units, along with an increase in the estimated elk population should allow for additional public tags to be issued.

Increase the number of elk tags available for public hunting – The Department has recently estimated that there are more elk within the North East EMU that previously thought. Consistent with this estimate of additional elk within the unit, additional public tags should be issued. Separating the EMU into two hunt units will allow the Department to issue more tags and manage where the elk are taken from.

K. Mike Ford | Sr. Regional Director | Rocky Mountain Elk Foundation
P.O. Box 1501 | Yreka, CA 96097 | (530) 842-2021 | mford@rmef.org

ROCKY MOUNTAIN ELK FOUNDATION

Northwest Elk Management Unit

Increase the number of elk tags available for public hunting – Increased estimates of elk populations within this unit should result in larger ***public*** hunt numbers.

We are concerned about the discussions and number of depredation tags being issued within this unit. Public hunting should be the focus of the Department to manage elk within this unit. If elk populations are too high within the unit to meet management objectives, more public tags should be issued. Provision of access to private lands by public hunters should play a major consideration when discussing depredation permits.

The Share program is also an extremely desirable program that allows the private land owner to benefit from allowing public access. This program gives the public and landowners the opportunity to benefit from the elk resource. The 555 Program also allows private landowners to benefit from the elk resource.

Thank you for the opportunity to make comments and provide input to the Draft Environmental Document to address potential impacts resulting from the implementation of Elk Hunting Regulations.

K. Mike Ford
Sr. Regional Director
Rocky Mountain Elk Foundation
mford@rmef.org
530-842-2021

Thanks for your concern and work, Joe. We have a terrible problem with wildlife corridors in So.Cal. As you likely know, our mountain lions are struggling. Temecula has grown rapidly as has the rest of Riverside co. and San Diego. Land acquisitions are dictated by development so since we have had a slow spell, which is good, we have not made progress on wildlife corridors. The freeway system has really taken its toll and many of the acquisitions have been postage stamps with no connection for larger animals.
Pam Nelson
sierraclubsmg.org

From: Pam Nelson [mailto:pamela05n@yahoo.com]
Sent: Monday, August 31, 2015 10:24 AM
To: Hobbs, Joe@Wildlife
Subject: Re: CA elk regulations

Thank you, Joe,
Since grassland habitats are disappearing I guess it seems that some think that elk are imperiled. As long as we keep adding protected lands, we have more chance to save the populations and keep them more diverse. Wildlife corridors are another item to consider, as you know. Hopefully these concepts are being considered by CDFW.
Pam

From: Pam Nelson [mailto:pamela05n@yahoo.com]
Sent: Sunday, August 30, 2015 12:02 PM
To: Hobbs, Joe@Wildlife
Subject: CA elk regulations

Hi, Joe,
I heard that there was a public meeting about elk hunting regulations last week.
I'm concerned that we are not protecting yet another of our native species and hope that stricter regs can remedy this.

I know that loss of habitat and over-hunting (both legal and illegal) have reduced the once great herds to small isolated herds throughout California. Can you tell me what is being proposed?

Pam Nelson
Chair, Santa Margarita group/Sierra Club

California Bowmen Hunters/State Archery Association

Date: September 4 2015

From: Robert Moore
Legislative Coordinator
California Bowmen Hunters
State Archery Association

To: Joe Hobbs
California Department of Fish and Wildlife
1812 9th Street
Sacramento, CA 95811

Ref: Elk Scoping Session

Dear Joe,

Hearing some of the comments during the meeting held August 26th in Sacramento I would like to propose adding archery only elk tags to the North Coast (North West) Unit. For depredation purposes in urban settings, bowhunting is a valuable tool to address safety concerns.

Thanks for your consideration,

Robert Moore
Legislative Coordinator
California Bowmen Hunters
State Archery Association
moorerobt@surewest.net

From: jcpjcs@aol.com [mailto:jcpjcs@aol.com]
Sent: Tuesday, September 15, 2015 4:07 PM
To: Hobbs, Joe@Wildlife
Subject: Re: elk update

Thank you for taking the time to explain things regarding the scoping process….the following are comments we are sending for your consideration:
The comments are being submitted after several meetings and conversations with our Resource Conservation District members, Lake Earl Grange members, Farm Bureau members and a great number of other private property owners who are aware or have experienced the Roosevelt Elk and their conflict with our citizens.

These comments are made with the fact in mind that depredation permits are next to impossible to obtain for major elk damages to our property. Elk damages have been carefully documented over the past few years----and damages the past 2 years have rapidly increased due to the explosion of the elk population.

We haven't been able to protect our health and safety, our livestock, crops, fences, gardens, orchards or any other aspects of our private property from these DISPLACED elk.

1. Public Health and Safety

* the California Highway Patrol has completed a document on elk vs vehicles in Del Norte Co. The elk have become a highway HAZARD.

* CHILDREN AT THE BUS STOPS through out the Bertch area and Elk Valley are within a few feet of bull elk and cows with their calves.

*Elk in the yards of people in the residential areas…mainly the Bertch and Lake Earl areas are a constant danger to residents and children at play. Pets have been attacked or trampled in the backyards

2. Herd Health

*Absolutely no testing for diseases has taken place regarding the elk population in Del Norte County. This type of "lack of management" poses a constant threat for diseases to be spread to all domestic livestock. This is verified by a letter from Ben Gonzales (St. Vet for Ca Fish and Wildlife). At this time, nearly all herds (dairy and beef) are subject to elk contact on a daily basis. (see previously submitted comments for a description of many of these diseases)

3. Examples of Direct Damages (documented by Dave Lancaster)

Destruction of the following: Small organic vegetable crops
Lilly crops
Commercial and Private Greenhouses
Nurseries
Orchards
Backyard gardens
Yard decorative plants
Septic mound systems

Lawn sprinkler systems
Yard fences
Livestock fencing
Backyard pets
Severe damage to Horses
Severe damage to livestock

4. 80-90% of Del Norte County is in State or Federal ownership. Plus there are additional Tribal Lands.

* No cooperation or engaged habitat planning with the US Forest Service, National Parks, California State Parks or the California Depart of Fish and Wildlife is taking place for elk management.

* The result is DISPLACED elk searching for food with great intensity to keep from starving. Their quest for food places tremendous demand on adjacent private property. The elk are in constant conflict with ag enterprises and residential housing areas. (documented by Dave Landcaster)

Thank you in advance for your consideration while reading our comments. Please call if you have questions.

Sincerely,
Helen Ferguson
Chair
Lake Earl Grange #577 Environmental
Policy and Procedure Committe

COUNTY OF DEL NORTE
BOARD OF SUPERVISORS

981 "H" Street, Suite 200
Crescent City, California 95531

Phone
(707) 464-7204

Fax
(707) 464-1165

09/22/2015

California Department of Fish and Wildlife
Attn: Joe Hobbs, Elk and Antelope Coordinator
1812 9th Street
Sacramento, CA 95811

RE: Comments – Elk hunting regulation Initial Study

Dear Mr. Hobbs,

The Del Norte County Board of Supervisors is submitting the following comments regarding the Initial Study Checklist and Notice of Preparation related to the potential impacts resulting from implementation of elk hunting regulations:

Del Norte County has experienced a significant increase in elk population and the subsequent impacts associated with having such a large population including but not limited to impacts on private property (both residential and agricultural), traffic and circulation throughout the County, and the general health and welfare of or residents and visitors. These impacts are exacerbated by the limited number of tags currently available, as well as limited hunting areas and opportunities.

The Board of Supervisors fully support s an increase in hunting opportunities, the establishment of new hunt zones, expansion of season dates, modification of existing hunt boundaries that result in greater hunting opportunities, additional hunts within these zones and expansion of existing hunts. Review of the Initial Study has resulted in the County's concurrence with the department's assessment of impacts that less than significant effects on the environment will result from the proposed action. The Del Norte County Board of Supervisors will continue to be actively engaged in the environmental document process as well as subsequent preparation of regional specific plans that assist in addressing the impacts of elk populations in Del Norte County. Early Coordination between the California Department of Fish and Wildlife and Del Norte County prior to initiating the public process is imperative to a successful outcome.

Sincerely,

David Finigan
Chair, Del Norte County Board of Supervisors

CC: Members, Del Norte County Board of Supervisors

COUNTY OF DEL NORTE
COUNTY ADMINISTRATIVE OFFICE

981 "H" Street, Suite 210
Crescent City, California 95531

Phone
(707) 464-7214

Fax
(707) 464-1165

California Department of Fish and Wildlife
Attn: Joe Hobbs, Elk and Antelope Coordinator
1812 9th Street
Sacramento, CA 95811

09/24/15

RE: Comments – Elk Hunting Plan Changes and Issues

Dear Mr. Hobbs,

The following are comments, requests and issues that the Del Norte County Board of Supervisors have discussed or received comments on as part of Public Comment at regular meetings, committee meetings, or through other comments to the Board by the public:

Del Norte County has experienced a significant increase in elk population and the subsequent impacts associated with having such a large and wide ranging population including, but not limited to, impacts on private property (both residential and agricultural), traffic and circulation throughout the County, and the general health and welfare of residents and visitors. These impacts are exacerbated by the limited number of tags currently available, as well as limited hunting areas and opportunities.

The Board of Supervisors fully support s an increase in hunting opportunities, the establishment of new hunt zones, expansion of season dates, modification of existing hunt boundaries that result in greater hunting opportunities, additional hunts within these zones and expansion of existing hunts. In addition to addressing these issues there are additional private property concerns that should be addressed in an Elk Management Plan. Impacts to private property in the form of destroyed infrastructure, vegetation reduction, livestock, and interactions with property owners will require a fresh review of solutions revolving around the existing depredation permit process so that applications may be more efficiently processed and ultimately effective. Hunt zones should be reviewed so as to allow for the greatest hunter opportunity that also allows protection to property owners through reduced liability. Issues related to management of the herds that inhabit State and National park lands must be considered and addressed as part of the expanded hunting seasons/opportunities. Coordination of existing and proposed programs available to property owners will assist in making the process successful.

The Del Norte County Board of Supervisors will continue to be actively engaged in the preparation of regional specific plans that assist in addressing the impacts of elk populations in Del Norte County. Early Coordination between the California Department of Fish and Wildlife and Del Norte County prior to initiating the public process is imperative to a successful outcome.

Sincerely,

Jay Sarina
County Administrative Officer

CC: Members, Del Norte County Board of Supervisors

DEL NORTE

RESOURCE

CONSERVATION DISTRICT

September 24, 2015

Joe Hobbs
California Department of Fish and Wildlife
Elk and Antelope Coordinator
1812 9th Street
Sacramento, CA 95811

Dear Joe Hobbs,

The Del Norte Resource Conservation District thanks you for the opportunity to input on the framework of changes for elk hunting in Del Norte.

The Del Norte Resource Conservation supports the General Hunt and Shared Habitat Alliance for Recreational Enhancement (SHARE). Suggestions at our last RCD meeting with many Del Norte private landowners were to give Del Norte its own boundaries. Many Del Norte private landowners are willing to enter into the SHARE program with the goals of a program in place to reduce elk population in Del Norte County and at the same time, meet your mission statement, "manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public".

The group would like to see hunts ranging from September (General) October through January (SHARE) in Del Norte County to include increased cow tags with bulls to encourage participating hunters. We have concerns on the liability protection program offered by CA. Fish and Wildlife but through a collaboration effort we are working towards a solution.

Thanks for your help in working towards a manageable elk program for Del Norte. This is essential in moving forward towards addressing public concerns on safety, damage to livestock and property, and herd populations.

Sincerely,

Linda Crockett-Manager
The Del Norte Resource Conservation
241 1st Street
Smith River, CA 95567
707 487 7630

From: Del norte Rcd [mailto:delnortercd@yahoo.com]
Sent: Thursday, September 24, 2015 9:24 AM
To: Hobbs, Joe@Wildlife
Subject: Elk Management Plan

Linda. Please tell Joe the boundary for the NW hunt and the share tag allocation should be separated into JUST Del Norte county. The number of Del Norte tags needs to be greatly increased with cow tags preferred and of course some bulls. The local hunters should be given some priority hopefully. The number of total tags MUST be increased greatly in this county. **Rob Miller. President DNCo Farm Bureau...**

From: jcpjcs@aol.com [mailto:jcpjcs@aol.com]
Sent: Thursday, September 24, 2015 4:12 PM
To: Hobbs, Joe@Wildlife
Subject: Re: elk update

Attention: Joe Hobbs

As a result of a small gathering of interested property owners, members of the Del Norte Co.
Farm Bureau, the local Ca Fish and Wildlife Advisory Committee, Del Norte Resource Conservation District and the Lake Earl Grange the following ideas are being submitted for consideration.

"Elk Hunting" Initial Study

1. Biological Resources

……."The goal of California's Elk program is to sustain or increase elk populations and ensure they are managed within habitat capabilities and in consideration of other land uses."

TO ATTAIN THIS GOAL/MISSION STATEMENT SOME MAJOR MANAGEMENT STRATAGIES NEED TO BE IMPLEMENTED IN CERTAIN AREAS IN DEL NORTE COUNTY. AT THIS TIME OUR ELK POPULATION IS IN MAJOR CONFLICT WITH THE STATED GOAL.

SUSTAIN OR INCREASE----in Del Norte County we need the population of Elk DECREASED in various parts of our County. This is going to require some very keen management.

*First of all ,we request Del Norte County and Humboldt County be separated. Our concentrations and locations of elk damage seem to be different than those of Humboldt County. We need an opportunity to reduce population numbers that are destroying private property in residential areas, small nursery businesses, small fruit and vegetable producers, large flower producers, and damaging dairy and beef operations. With the elk in such close range of our local residents there is a great concern for public safety as well as for industrial damages that are occurring.

There is a need to reduce populations that could occur through expanded hunting opportunities for the general public. This can only be achieved through higher tag allotments for specific areas which would require an increase in the overall tag allotments for the State.

Additionally, more landowner tags could be considered for those rural areas that are having significant elk damages. We feel the required land area for such tags would be much for beneficial for damage control if the required land area was reduced to 50-100 acres to qualify for a tag. This would provide more monetary compensation to offset damages for smaller producers as opposed to having them just enrolled in the SHARE program. Our mosaic makeup of our interested landowners for the SHARE program success in Del Norte will indeed help population reduction but in the long run won't

provide significant monetary compensation as most, if not all money, is expected to purchase insurance for “third party” claims for damages.

It was also suggested to run an early season for disabled hunters.

*MANAGE WITHIN HABITAT CAPABILITIES---In trying to attain the proposed goal for Elk Management in California another area for consideration and intense investigation is “habitat management” (or the lack of habitat management for elk in Del Norte County by ALL State and Federal Agencies)
*** In a letter from Merv George (USFS Regional Supervisor) nothing regarding elk management and their habitat management has occurred. (Freedom of Information Act request in June 2015) This is in contrast to a statement in the Ca Elk Management Plan which states “The Six Rivers National Forest has recently undertaken several seral habitat enhancement projects which will benefit Elk”
***The Lake Earl Wildlife Area in Del Norte County does have a handful of Elk that graze in the McLaughlin ranch area . However, it a false statement in the California Elk Management Draft plan that states, “Continue to maintain elk habitat on the Department’s LEWA.” The vegetation on several thousand acres within the complex in rank vegetation as the CA Dept of Fish and Wildlife has withdrawn the leases to allow grazing the past 3 years. As a result the Elk are going to adjacent farm lands and backyards of residential areas as they prefer shorter and sweeter grasses. This needs to be fixed!….this isn’t habitat management!
***With regards to the Ca State and National Park systems in Del Norte NO HABITAT MANAGEMENT FOR ELK IS TAKING PLACE!
*In a conversation with Jeff Bomke (State Park Sup. for Del Norte)… he stated that no management for elk occurred under their management.
*The Ca State Parks office in Sacramento couldn't provide any documentation for elk management in the Ca State Parks in Del Norte County. Actually they couldn’t even answer a California Public Records request for..”who has the authority and responsibility for managing wildlife in the California State Parks?”. They said they were “embarrassed to admit it.”
*John Laird's office for the Committee of Natural Resources couldn’t or wouldn't provide and answer either.
*After a Freedom of Information request to Steve Prokof (local National Sup) in the National Park System, I received a letter which said it would cost me $5,040.00 for them to answer the one question (I refined my original request) “who has the authority and responsibility for managing wildlife in the National Parks in Del Norte County?”
So I guess it is safe to say they really don't know the answer and one would conclude “no elk management is taking place.” And this of course this is plainly evident by touring their lands that are overgrown with dense berry vines and brush.

In summary of the Redwood National Park, US Forest Service, Ca State Parks and the Ca Depart of Fish and Wildlife’s ELK HABITAT MANAGEMENT on our Public Lands is “Missing in Action”. These agencies aren’t following their own codes and policies. This must change as nearly 90% of the land in Del Norte County is in State and Federal

ownership. And single speci management (elk habitat) isn't their sole purpose…….but to just walk away and manage nothing isn't the answer.
It is apparent there needs to be a united effort of our local elected officials, ag organizations, Ca Highway Patrol, Cal Trans, our local Sheriff, community organizations and concerned private citizens to get these agencies to the table and make them responsible for providing habitat for not just the Elk but for all species existing on public lands-------OR SIGNIFICANTLY LOWER POPULATIONS NUMBERS. In contrast to Karen Kovac's statement(at the last public meeting with the BOS, the Northern Regional reps and program management authors) "We thank you for feeding the Aleutian Geese and their success.…now you have the Elk!" IT ISN'T OUR RESPONSIBILITY TO FEED WILDLIFE WHO ARE HUNGRY BECAUSE THE AGENCIES AREN'T DOING THEIR HABITAT MANAGEMENT FOR SPECIES UNDER THEIR WATCH AND CARE.

In conclusion, ...Elk in Del Norte County are not being managed in a manner that contributes to the total ecosystem functions. The Elk are receiving less than minimal habitat opportunities, at best, for foraging and browsing on public lands in Del Norte County. This ongoing lack of management "displaces" them to private lands which conflicts with Ca Fish and Wildlife's goal for elk management in California. Therefore, with depredation permits being next to impossible to obtain, the only way to meet the Ca Fish and Wildlife's Management goal is to lengthen and increase seasons, increasing tag allotments, employ landowner programs such as allowing smaller land parcels incurring elk damage to obtain landowner tags, expanding the SHARE program, and working with PLMs that INCLUDE proposed management plans regarding negative impacts to adjacent property owners in Del Norte County.

Thank you.....if you have any questions please call 707-218-5769

Sincerely,

Helen Ferguson
Chair, Lake Earl Grange Environmental
Policy and Procedure Committee

Appendix 4 Simulated Computer Runs – Elk Harvest (Elk Pop)

```
SISKIYOU ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL AND PLM 2016
              Ratio = 20/100/27 - Maximum Calf Survival = 60%
                 THIS PROGRAM CALCULATES CHANGES IN
                 HERD
                 CHARACTERISTICS BASED ON VARIOUS
                 HARVEST
                 RATES.

CURRENT CONDITION = NO CHANGE 20 BULL AND 20 ANTLERLESS (4 PLM )
TO HARVEST APPROXIMATELY 22 BULLS AND 14 COWS (INCLUDES COOPERATIVE ELK TAGS)
APPROXIMATE SUCCESS RATES; 70% BULL 40% COW
                                       HERD SIZE     600  ELK
       % BULLS LOST TO NON HUNTING CAUSES             16  %
        % COWS LOST TO NON HUNTING CAUSES             12  %
                 % OF BULLS KILLED BY HUNTERS         22  %
                  % OF COWS KILLED BY HUNTERS        3.5  %
```

				SURV.				BULLS	COWS
		BULLS	COWS	CALVES	TOTAL	K		HARVEST	HARVEST
START	AUG	82	408	110	600	600	|	20	12
YEAR 1	"	98	397	238	733	2000	|	22	14
YEAR 2	"	164	442	230	836	2000	|	22	14
YEAR 3	"	216	478	257	951	2000	|	22	14
YEAR 4	"	271	521	278	1071	2000	|	22	14
YEAR 5	"	327	569	304	1200	2000	|	22	14
YEAR 6	"	384	622	333	1339	2000	|	22	14
YEAR 7	"	444	682	365	1491	2000	|	22	14
YEAR 8	"	508	748	401	1658	2000	|	22	14
YEAR 9	"	577	823	441	1841	2000	|	22	14
YEAR 10	"	652	906	442	2000	2000	|	22	14

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	20	62
POST HUNT YR	2	33	54
POST HUNT YR	3	42	55
POST HUNT YR	4	49	55
POST HUNT YR	5	55	55
POST HUNT YR	6	60	55
POST HUNT YR	7	63	55
POST HUNT YR	8	66	55
POST HUNT YR	9	69	54
POST HUNT YR	10	71	50

SISKIYOU ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

PROPOSED HARVEST: BULL, ANTLERLESS, & EITHER-SEX
TO HARVEST UP TO 40 BULLS AND 50 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 70% bull and 40% antlerless

HERD SIZE	600	ELK
% BULLS LOST TO NON HUNTING CAUSES	16	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	40.5	%
% OF COWS KILLED BY HUNTERS	12.2	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	82	408	110	600	600	|	20	12
YEAR 1	"	98	406	238	742	2000	|	40	50
YEAR 2	"	149	428	214	791	2000	|	40	50
YEAR 3	"	182	437	227	845	2000	|	40	50
YEAR 4	"	214	451	232	897	2000	|	40	50
YEAR 5	"	244	466	241	951	2000	|	40	50
YEAR 6	"	273	483	250	1005	2000	|	40	50
YEAR 7	"	301	502	260	1063	2000	|	40	50
YEAR 8	"	328	524	272	1124	2000	|	40	50
YEAR 9	"	357	550	285	1191	2000	|	40	50
YEAR 10	"	386	578	300	1264	2000	|	40	50

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	16	67
POST HUNT YR	2	29	57
POST HUNT YR	3	37	59
POST HUNT YR	4	44	58
POST HUNT YR	5	49	58
POST HUNT YR	6	54	58
POST HUNT YR	7	58	57
POST HUNT YR	8	61	57
POST HUNT YR	9	63	57
POST HUNT YR	10	65	57

SISKIYOU ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST:BULL, ANTLERLESS, & EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 60 BULLS AND 75 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 75% bull and 50% antlerless

HERD SIZE	600	ELK
% BULLS LOST TO NON HUNTING CAUSES	16	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	60.7	%
% OF COWS KILLED BY HUNTERS	18.4	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	82	408	110	600	600	|	20	12
YEAR 1	"	98	406	238	742	1000	|	60	75
YEAR 2	"	132	405	199	736	1000	|	60	75
YEAR 3	"	145	387	198	730	2000	|	60	71
YEAR 4	"	155	374	190	718	2000	|	60	69
YEAR 5	"	160	360	183	702	2000	|	60	66
YEAR 6	"	161	346	176	683	2000	|	60	64
YEAR 7	"	159	334	170	662	2000	|	60	61
YEAR 8	"	155	321	163	640	2000	|	60	59
YEAR 9	"	149	309	157	616	2000	|	60	57
YEAR 10	"	141	298	152	591	2000	|	60	55

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	12	72
POST HUNT YR	2	22	60
POST HUNT YR	3	27	63
POST HUNT YR	4	31	62
POST HUNT YR	5	34	62
POST HUNT YR	6	36	62
POST HUNT YR	7	37	62
POST HUNT YR	8	36	62
POST HUNT YR	9	35	62
POST HUNT YR	10	33	62

SISKIYOU ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

HERD GROWTH: BULL, ANTLERLESS, & EITHER-SEX
TO HARVEST UP TO 55 BULLS AND 67 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 70% bull and 40% antlerless

HERD SIZE	800	ELK
% BULLS LOST TO NON HUNTING CAUSES	16	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	40.5	%
% OF COWS KILLED BY HUNTERS	12.2	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	109	544	147	800	800	|	20	12
YEAR 1	"	136	545	319	1001	2000	|	55	67
YEAR 2	"	202	574	287	1064	2000	|	55	67
YEAR 3	"	244	586	305	1135	2000	|	55	67
YEAR 4	"	287	605	312	1204	2000	|	55	67
YEAR 5	"	325	625	323	1274	2000	|	55	67
YEAR 6	"	363	648	335	1346	2000	|	55	67
YEAR 7	"	399	674	349	1422	2000	|	55	67
YEAR 8	"	435	704	365	1504	2000	|	55	67
YEAR 9	"	472	738	382	1593	2000	|	55	67
YEAR 10	"	511	776	403	1690	2000	|	55	67

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	17	67
POST HUNT YR	2	29	57
POST HUNT YR	3	36	59
POST HUNT YR	4	43	58
POST HUNT YR	5	48	58
POST HUNT YR	6	53	58
POST HUNT YR	7	57	57
POST HUNT YR	8	60	57
POST HUNT YR	9	62	57
POST HUNT YR	10	64	57

SISKIYOU ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

REDUCED HARVEST: BULL, ANTLERLESS, & EITHER-SEX
TO HARVEST UP TO 20 BULLS AND 25 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 70% bull and 40% antlerless

HERD SIZE	600	ELK
% BULLS LOST TO NON HUNTING CAUSES	16	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	20.2	%
% OF COWS KILLED BY HUNTERS	6.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	82	408	110	600	600	|	20	12
YEAR 1	"	98	406	238	742	2000	|	20	25
YEAR 2	"	166	450	229	845	2000	|	20	25
YEAR 3	"	219	486	255	960	2000	|	20	25
YEAR 4	"	274	530	277	1081	2000	|	20	25
YEAR 5	"	330	579	303	1212	2000	|	20	25
YEAR 6	"	388	635	333	1355	2000	|	20	25
YEAR 7	"	449	699	366	1514	2000	|	20	25
YEAR 8	"	514	772	405	1690	2000	|	20	25
YEAR 9	"	585	854	448	1887	2000	|	20	25
YEAR 10	"	663	948	389	2000	2000	|	20	25

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	21	62
POST HUNT YR	2	34	54
POST HUNT YR	3	43	55
POST HUNT YR	4	50	55
POST HUNT YR	5	56	55
POST HUNT YR	6	60	54
POST HUNT YR	7	64	54
POST HUNT YR	8	66	54
POST HUNT YR	9	68	54
POST HUNT YR	10	70	42

NORTHWESTERN CALIFORNIA ROOSEVELT ELK HERD - SIMULATION, GENERAL & PLM 2016
(Includes Proposed Del Norte and Humboldt Zones Combined)
Ratio = 45/100/40 - Maximum Calf Survival = 65%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

EITHER-SEX TAGS & COOPERATIVE TAGS, PLM
CURRENT CONDITION TAGS
HARVEST APPROXIMATELY 50 BULL AND 14 ANTLERLESS

HERD SIZE	1600	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	16.5	%
% OF BULLS KILLED BY HUNTERS	13	%
% OF COWS KILLED BY HUNTERS	1.6	%

	AU	BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	G	389	865	346	1600	1600	50	8
YEAR 1	"	384	860	557	1801	4000	50	14
YEAR 2	"	460	939	550	1949	4000	50	14
YEAR 3	"	513	1002	601	2117	4000	50	14
YEAR 4	"	573	1077	643	2292	4000	50	14
YEAR 5	"	633	1156	691	2480	4000	50	14
YEAR 6	"	697	1242	742	2681	4000	50	14
YEAR 7	"	763	1335	798	2897	4000	50	14
YEAR 8	"	834	1437	859	3130	4000	50	14
YEAR 9	"	911	1547	925	3382	4000	50	14
YEAR 10	"	992	1666	997	3655	4000	50	14

		BULL RATIO	CALF RATIO
START		45	40
POST HUNT YR	1	39	66
POST HUNT YR	2	44	59
POST HUNT YR	3	47	61
POST HUNT YR	4	49	60
POST HUNT YR	5	51	60
POST HUNT YR	6	53	60
POST HUNT YR	7	54	60
POST HUNT YR	8	55	60
POST HUNT YR	9	56	60
POST HUNT YR	10	57	60

DEL NORTE ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND PLM 2016
Ratio = 45/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

PROPOSED HARVEST: BULL, COW, EITHER SEX TAGS;
TO HARVEST UP TO 42 BULLS AND 62 COWS (INCLUDES PLM & COOPERATIVE TAGS)
Various combination of tags to achieved desired harvest,includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	750	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	24	%
% OF COWS KILLED BY HUNTERS	14.7	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	182	405	162	750	750	32	6
YEAR 1	"	174	423	268	864	2000	42	62
YEAR 2	"	199	435	242	876	2000	42	62
YEAR 3	"	209	435	250	893	2000	42	62
YEAR 4	"	219	438	250	906	2000	42	62
YEAR 5	"	227	440	252	918	2000	42	62
YEAR 6	"	233	443	253	930	2000	42	62
YEAR 7	"	239	447	255	941	2000	42	62
YEAR 8	"	243	451	258	952	2000	42	62
YEAR 9	"	248	456	261	964	2000	42	62
YEAR 10	"	252	461	264	977	2000	42	62

		BULL RATIO	CALF RATIO
START		45	40
POST HUNT YR	1	37	74
POST HUNT YR	2	42	65
POST HUNT YR	3	45	67
POST HUNT YR	4	47	66
POST HUNT YR	5	49	67
POST HUNT YR	6	50	66
POST HUNT YR	7	51	66
POST HUNT YR	8	52	66
POST HUNT YR	9	52	66
POST HUNT YR	10	53	66

DEL NORTE ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND PLM 2016
Ratio = 45/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL, COW, EITHER SEX TAGS;INCLUDES PLM & COOPERATIVE TAGS
TO HARVEST UP TO 63 BULL AND 93 COW:
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	750	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	36	%
% OF COWS KILLED BY HUNTERS	22	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	182	405	162	750	750	|	32	6
YEAR 1	"	174	423	268	864	2000	|	63	93
YEAR 2	"	184	408	221	813	2000	|	66	90
YEAR 3	"	171	377	213	762	2000	|	62	83
YEAR 4	"	162	353	197	712	2000	|	58	78
YEAR 5	"	152	329	184	665	2000	|	55	72
YEAR 6	"	142	307	172	621	2000	|	51	68
YEAR 7	"	133	286	160	579	2000	|	48	63
YEAR 8	"	124	267	150	540	2000	|	45	59
YEAR 9	"	116	249	140	504	2000	|	42	55
YEAR 10	"	108	232	130	470	2000	|	39	51

		BULL RATIO	CALF RATIO
START		45	40
POST HUNT YR	1	34	81
POST HUNT YR	2	37	69
POST HUNT YR	3	37	72
POST HUNT YR	4	38	72
POST HUNT YR	5	38	72
POST HUNT YR	6	38	72
POST HUNT YR	7	38	72
POST HUNT YR	8	38	72
POST HUNT YR	9	38	72
POST HUNT YR	10	38	72

DEL NORTE ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND PLM 2016
Ratio = 45/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL, COW, EITHER SEX TAGS;INCLUDES PLM & COOPERATIVE TAGS
TO HARVEST UP TO 60 BULL AND 82 COW:
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	25	%
% OF COWS KILLED BY HUNTERS	14.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	243	541	216	1000	1000	|	32	6
YEAR 1	"	240	566	358	1163	2000	|	60	82
YEAR 2	"	269	583	324	1176	2000	|	60	82
YEAR 3	"	278	583	336	1198	2000	|	60	82
YEAR 4	"	290	589	336	1215	2000	|	60	82
YEAR 5	"	298	594	340	1232	2000	|	60	82
YEAR 6	"	306	600	343	1249	2000	|	60	82
YEAR 7	"	313	607	347	1267	2000	|	60	82
YEAR 8	"	320	615	352	1287	2000	|	60	82
YEAR 9	"	327	623	357	1307	2000	|	60	82
YEAR 10	"	334	633	363	1330	2000	|	60	82

		BULL RATIO	CALF RATIO
START		45	40
POST HUNT YR	1	37	74
POST HUNT YR	2	42	65
POST HUNT YR	3	44	67
POST HUNT YR	4	45	66
POST HUNT YR	5	47	66
POST HUNT YR	6	48	66
POST HUNT YR	7	48	66
POST HUNT YR	8	49	66
POST HUNT YR	9	49	66
POST HUNT YR	10	50	66

DEL NORTE ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL AND PLM 2016
Ratio = 45/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL, COW, EITHER SEX TAGS;
TO HARVEST UP TO 21 BULLS AND 31 COWS (INCLUDES PLM & COOPERATIVE TAGS)
Various combination of tags to achieved desired harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	750	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	12.2	%
% OF COWS KILLED BY HUNTERS	7.3	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	182	405	162	750	750	|	32	6
YEAR 1	"	174	423	268	864	2000	|	21	31
YEAR 2	"	215	463	263	940	2000	|	21	31
YEAR 3	"	244	496	289	1028	2000	|	21	31
YEAR 4	"	275	536	311	1123	2000	|	21	31
YEAR 5	"	307	582	339	1228	2000	|	21	31
YEAR 6	"	342	634	369	1344	2000	|	21	31
YEAR 7	"	379	693	404	1475	2000	|	21	31
YEAR 8	"	420	760	444	1623	2000	|	21	31
YEAR 9	"	465	837	489	1791	2000	|	21	31
YEAR 10	"	516	924	540	1981	2000	|	21	31

		BULL RATIO	CALF RATIO
START		45	40
POST HUNT YR	1	39	68
POST HUNT YR	2	45	61
POST HUNT YR	3	48	62
POST HUNT YR	4	50	62
POST HUNT YR	5	52	61
POST HUNT YR	6	53	61
POST HUNT YR	7	54	61
POST HUNT YR	8	55	61
POST HUNT YR	9	55	61
POST HUNT YR	10	55	60

HUMBOLDT ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 50/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

PROPOSED PROJECT: BULL, COW, EITHER SEX TAGS; INCLUDING COOPERATIVE & PLM
TO HARVEST UP TO 64 BULLS & 65 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	850	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	30	%
% OF COWS KILLED BY HUNTERS	14	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	224	447	179	850	850	30	6
YEAR 1	"	212	467	296	975	2000	64	65
YEAR 2	"	222	484	269	975	2000	64	65
YEAR 3	"	220	486	280	987	2000	64	65
YEAR 4	"	222	494	282	998	2000	64	65
YEAR 5	"	225	501	287	1013	2000	64	65
YEAR 6	"	228	510	292	1030	2000	64	65
YEAR 7	"	233	520	298	1050	2000	64	65
YEAR 8	"	239	531	304	1074	2000	64	65
YEAR 9	"	245	543	312	1100	2000	64	65
YEAR 10	"	253	558	320	1131	2000	64	65

		BULL RATIO	CALF RATIO
START		50	40
POST HUNT YR	1	37	74
POST HUNT YR	2	38	64
POST HUNT YR	3	37	67
POST HUNT YR	4	37	66
POST HUNT YR	5	37	66
POST HUNT YR	6	37	66
POST HUNT YR	7	37	66
POST HUNT YR	8	38	65
POST HUNT YR	9	38	65
POST HUNT YR	10	38	65

HUMBOLDT ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL,SHARE, & PLM 2016
Ratio = 50/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL, COW, & EITHER SEX TAGS; INCLUDES COOPERATIVE TAGS
TO HARVEST UP TO 95 BULLS 95 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	850	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	44.5	%
% OF COWS KILLED BY HUNTERS	20.3	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	224	447	179	850	850	|	30	6
YEAR 1	"	212	467	296	975	2000	|	95	95
YEAR 2	"	199	458	249	906	2000	|	89	93
YEAR 3	"	176	431	244	852	2000	|	79	87
YEAR 4	"	165	410	230	805	2000	|	73	83
YEAR 5	"	155	389	219	762	2000	|	69	79
YEAR 6	"	147	369	207	723	2000	|	65	75
YEAR 7	"	139	350	197	686	2000	|	62	71
YEAR 8	"	132	332	187	651	2000	|	59	67
YEAR 9	"	125	315	177	617	2000	|	56	64
YEAR 10	"	118	299	168	586	2000	|	53	61

		BULL RATIO	CALF RATIO
START		50	40
POST HUNT YR	1	32	79
POST HUNT YR	2	30	68
POST HUNT YR	3	29	71
POST HUNT YR	4	28	70
POST HUNT YR	5	28	71
POST HUNT YR	6	28	71
POST HUNT YR	7	28	71
POST HUNT YR	8	28	71
POST HUNT YR	9	28	71
POST HUNT YR	10	28	71

HUMBOLDT ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL, SHARE & PLM 2016
Ratio = 50/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL, COW, EITHER SEX TAGS; INCLUDING COOPERATIVE & PLM
TO HARVEST UP TO 79 BULLS & 82 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	1100	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	28	%
% OF COWS KILLED BY HUNTERS	13.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	289	579	232	1100	1100	|	30	6
YEAR 1	"	281	606	384	1271	2000	|	79	82
YEAR 2	"	296	630	351	1277	2000	|	79	82
YEAR 3	"	295	637	367	1299	2000	|	79	82
YEAR 4	"	300	650	372	1322	2000	|	79	82
YEAR 5	"	305	664	381	1350	2000	|	79	82
YEAR 6	"	313	680	390	1383	2000	|	79	82
YEAR 7	"	322	698	401	1420	2000	|	79	82
YEAR 8	"	332	719	413	1464	2000	|	79	82
YEAR 9	"	345	742	427	1514	2000	|	79	82
YEAR 10	"	360	769	442	1571	2000	|	79	82

		BULL RATIO	CALF RATIO
START		50	40
POST HUNT YR	1	39	73
POST HUNT YR	2	40	64
POST HUNT YR	3	39	66
POST HUNT YR	4	39	65
POST HUNT YR	5	39	65
POST HUNT YR	6	39	65
POST HUNT YR	7	39	65
POST HUNT YR	8	40	65
POST HUNT YR	9	40	65
POST HUNT YR	10	41	64

HUMBOLDT ROOSEVELT ELK HERD - SIMULATION RUNS, GENERAL,SHARE, & PLM 2016
Ratio = 50/100/40 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL, COW, EITHER SEX TAGS; INCLUDING COOPERATIVE & PLM
TO HARVEST UP TO 32 BULLS & 32 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	850	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	15.2	%
% OF COWS KILLED BY HUNTERS	6.8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	224	447	179	850	850	|	30	6
YEAR 1	"	212	467	296	975	2000	|	32	32
YEAR 2	"	246	513	292	1051	2000	|	32	32
YEAR 3	"	270	552	323	1144	2000	|	32	32
YEAR 4	"	299	600	349	1247	2000	|	32	32
YEAR 5	"	331	653	381	1365	2000	|	32	32
YEAR 6	"	367	714	416	1497	2000	|	32	32
YEAR 7	"	407	784	457	1648	2000	|	32	32
YEAR 8	"	452	863	504	1819	2000	|	32	32
YEAR 9	"	504	953	543	2000	2000	|	32	32
YEAR 10	"	557	1050	393	2000	2000	|	32	32

		BULL RATIO	CALF RATIO
START		50	40
POST HUNT YR	1	41	68
POST HUNT YR	2	44	61
POST HUNT YR	3	46	62
POST HUNT YR	4	47	61
POST HUNT YR	5	48	61
POST HUNT YR	6	49	61
POST HUNT YR	7	50	61
POST HUNT YR	8	51	61
POST HUNT YR	9	51	59
POST HUNT YR	10	52	39

MARBLE MOUNTAINS ROOSEVELT ELK HERD - SIMULATION RUNS, 2016
Ratio = 60/100/41 - Maximum Calf Survival = 62%
(INCLUDES BOTH PROPOSED MARBLE MOUNTAIN NORTH AND SOUTH ZONES)
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION = BULL, ANTLERLESS & EITHER-SEX (COOPERATIVE TAGS)
CURRENT HARVEST FOR MARBLE MTN IS APPROXIMATELY 29 BULL 7 ANTLERLESS
Various combination of tags to achieved desired harvest, includes Cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	3000	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	3.1	%
% OF COWS KILLED BY HUNTERS	0.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	896	1493	612	3000	3000	29	7
YEAR 1	"	938	1487	921	3346	6000	29	7
YEAR 2	"	1096	1610	917	3623	6000	29	7
YEAR 3	"	1220	1711	994	3925	6000	29	7
YEAR 4	"	1350	1826	1056	4233	6000	29	7
YEAR 5	"	1479	1948	1128	4555	6000	29	7
YEAR 6	"	1611	2079	1203	4893	6000	29	7
YEAR 7	"	1747	2218	1284	5250	6000	29	7
YEAR 8	"	1888	2368	1371	5627	6000	29	7
YEAR 9	"	2036	2528	1436	6000	6000	29	7
YEAR 10	"	2180	2688	1132	6000	6000	29	7

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	61	62
POST HUNT YR	2	67	57
POST HUNT YR	3	70	58
POST HUNT YR	4	73	58
POST HUNT YR	5	75	58
POST HUNT YR	6	76	58
POST HUNT YR	7	78	58
POST HUNT YR	8	79	58
POST HUNT YR	9	80	57
POST HUNT YR	10	80	42

MARBLE MOUNTAINS NORTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016

Ratio = 60/100/41 - Maximum Calf Survival = 62%

THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED HARVEST = BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
HARVEST up to 61 BULLS AND 60 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	1500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	13	%
% OF COWS KILLED BY HUNTERS	8.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	448	746	306	1500	1500	|	15	6
YEAR 1	"	469	741	459	1669	3000	|	61	60
YEAR 2	"	510	756	422	1688	3000	|	61	60
YEAR 3	"	528	753	431	1712	3000	|	61	60
YEAR 4	"	546	754	430	1730	3000	|	61	60
YEAR 5	"	560	754	430	1745	3000	|	61	60
YEAR 6	"	572	755	430	1757	3000	|	61	60
YEAR 7	"	581	755	431	1767	3000	|	61	60
YEAR 8	"	588	756	431	1775	3000	|	61	60
YEAR 9	"	594	756	431	1782	3000	|	61	60
YEAR 10	"	599	757	432	1788	3000	|	61	60

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	60	67
POST HUNT YR	2	64	61
POST HUNT YR	3	67	62
POST HUNT YR	4	70	62
POST HUNT YR	5	72	62
POST HUNT YR	6	73	62
POST HUNT YR	7	75	62
POST HUNT YR	8	76	62
POST HUNT YR	9	77	62
POST HUNT YR	10	77	62

MARBLE MOUNTAIN NORTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016
Ratio = 60/100/41 - Maximum Calf Survival = 62%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST; BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 90 BULLS AND 90 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved desired harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	1500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	19.1	%
% OF COWS KILLED BY HUNTERS	12.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	448	746	306	1500	1500	|	15	4
YEAR 1	"	469	743	460	1672	3000	|	90	90
YEAR 2	"	487	733	405	1625	3000	|	93	89
YEAR 3	"	477	703	400	1580	3000	|	91	85
YEAR 4	"	469	679	383	1530	3000	|	90	82
YEAR 5	"	457	654	370	1481	3000	|	87	79
YEAR 6	"	443	631	356	1431	3000	|	85	76
YEAR 7	"	430	608	344	1381	3000	|	82	74
YEAR 8	"	416	586	331	1333	3000	|	79	71
YEAR 9	"	401	565	319	1286	3000	|	77	68
YEAR 10	"	388	545	308	1241	3000	|	74	66

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	58	70
POST HUNT YR	2	61	63
POST HUNT YR	3	63	65
POST HUNT YR	4	64	64
POST HUNT YR	5	64	64
POST HUNT YR	6	65	64
POST HUNT YR	7	65	64
POST HUNT YR	8	65	64
POST HUNT YR	9	65	64
POST HUNT YR	10	65	64

MARBLE MOUNTAINS NORTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016

Ratio = 60/100/41 - Maximum Calf Survival = 62%

THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH = BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
HARVEST up to 69 BULLS AND 80 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

	HERD SIZE	2000	ELK
% BULLS LOST TO NON HUNTING CAUSES		20	%
% COWS LOST TO NON HUNTING CAUSES		17	%
% OF BULLS KILLED BY HUNTERS		11	%
% OF COWS KILLED BY HUNTERS		8.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	597	995	408	2000	2000	|	15	6
YEAR 1	"	629	990	613	2232	3000	|	69	80
YEAR 2	"	693	1010	564	2267	3000	|	69	80
YEAR 3	"	725	1006	576	2307	3000	|	69	80
YEAR 4	"	755	1007	574	2336	3000	|	69	80
YEAR 5	"	778	1008	575	2361	3000	|	69	80
YEAR 6	"	797	1008	575	2380	3000	|	69	80
YEAR 7	"	812	1009	575	2397	3000	|	69	80
YEAR 8	"	825	1010	576	2410	3000	|	69	80
YEAR 9	"	835	1010	576	2421	3000	|	69	80
YEAR 10	"	843	1011	577	2431	3000	|	69	80

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	61	67
POST HUNT YR	2	67	61
POST HUNT YR	3	71	62
POST HUNT YR	4	74	62
POST HUNT YR	5	76	62
POST HUNT YR	6	78	62
POST HUNT YR	7	80	62
POST HUNT YR	8	81	62
POST HUNT YR	9	82	62
POST HUNT YR	10	83	62

MARBLE MOUNTAINS NORTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016

Ratio = 60/100/41 - Maximum Calf Survival = 62%

THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST = BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
HARVEST up to 30 BULLS AND 30 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	1500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	6.5	%
% OF COWS KILLED BY HUNTERS	4	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	448	746	306	1500	1500	|	15	6
YEAR 1	"	469	741	459	1669	3000	|	30	30
YEAR 2	"	534	781	441	1757	3000	|	30	30
YEAR 3	"	579	807	466	1852	3000	|	30	30
YEAR 4	"	626	839	482	1946	3000	|	30	30
YEAR 5	"	669	871	501	2042	3000	|	30	30
YEAR 6	"	711	907	522	2140	3000	|	30	30
YEAR 7	"	753	945	544	2242	3000	|	30	30
YEAR 8	"	796	985	567	2348	3000	|	30	30
YEAR 9	"	839	1028	592	2460	3000	|	30	30
YEAR 10	"	884	1075	619	2578	3000	|	30	30

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	62	64
POST HUNT YR	2	67	59
POST HUNT YR	3	71	60
POST HUNT YR	4	74	60
POST HUNT YR	5	76	60
POST HUNT YR	6	78	59
POST HUNT YR	7	79	59
POST HUNT YR	8	80	59
POST HUNT YR	9	81	59
POST HUNT YR	10	82	59

MARBLE MOUNTAINS SOUTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016

Ratio = 60/100/41 - Maximum Calf Survival = 62%

THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED HARVEST= BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 61 BULLS AND 60 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	1500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	13	%
% OF COWS KILLED BY HUNTERS	8.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	448	746	306	1500	1500	|	15	4
YEAR 1	"	469	743	460	1672	3000	|	61	60
YEAR 2	"	510	758	423	1691	3000	|	61	60
YEAR 3	"	529	755	433	1716	3000	|	61	60
YEAR 4	"	547	756	431	1734	3000	|	61	60
YEAR 5	"	561	756	431	1749	3000	|	61	60
YEAR 6	"	573	757	432	1761	3000	|	61	60
YEAR 7	"	582	757	432	1771	3000	|	61	60
YEAR 8	"	590	758	432	1780	3000	|	61	60
YEAR 9	"	596	758	432	1787	3000	|	61	60
YEAR 10	"	601	759	433	1793	3000	|	61	60

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	60	67
POST HUNT YR	2	64	61
POST HUNT YR	3	67	62
POST HUNT YR	4	70	62
POST HUNT YR	5	72	62
POST HUNT YR	6	74	62
POST HUNT YR	7	75	62
POST HUNT YR	8	76	62
POST HUNT YR	9	77	62
POST HUNT YR	10	77	62

MARBLE MOUNTAIN SOUTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016
Ratio = 60/100/41 - Maximum Calf Survival = 62%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST; BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 90 BULLS AND 90 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved desired harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	1500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	19.1	%
% OF COWS KILLED BY HUNTERS	12.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	448	746	306	1500	1500	|	15	4
YEAR 1	"	469	743	460	1672	3000	|	90	90
YEAR 2	"	487	733	405	1625	3000	|	93	89
YEAR 3	"	477	703	400	1580	3000	|	91	85
YEAR 4	"	469	679	383	1530	3000	|	90	82
YEAR 5	"	457	654	370	1481	3000	|	87	79
YEAR 6	"	443	631	356	1431	3000	|	85	76
YEAR 7	"	430	608	344	1381	3000	|	82	74
YEAR 8	"	416	586	331	1333	3000	|	79	71
YEAR 9	"	401	565	319	1286	3000	|	77	68
YEAR 10	"	388	545	308	1241	3000	|	74	66

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	58	70
POST HUNT YR	2	61	63
POST HUNT YR	3	63	65
POST HUNT YR	4	64	64
POST HUNT YR	5	64	64
POST HUNT YR	6	65	64
POST HUNT YR	7	65	64
POST HUNT YR	8	65	64
POST HUNT YR	9	65	64
POST HUNT YR	10	65	64

MARBLE MOUNTAINS SOUTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016

Ratio = 60/100/41 - Maximum Calf Survival = 62%

THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH = BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
HARVEST up to 82 BULLS AND 80 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

	HERD SIZE	2000	ELK
% BULLS LOST TO NON HUNTING CAUSES		20	%
% COWS LOST TO NON HUNTING CAUSES		17	%
% OF BULLS KILLED BY HUNTERS		13	%
% OF COWS KILLED BY HUNTERS		8.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	597	995	408	2000	2000	|	15	6
YEAR 1	"	629	990	613	2232	3000	|	82	80
YEAR 2	"	683	1010	564	2257	3000	|	82	80
YEAR 3	"	707	1006	576	2289	3000	|	82	80
YEAR 4	"	730	1007	574	2312	3000	|	82	80
YEAR 5	"	748	1008	575	2331	3000	|	82	80
YEAR 6	"	763	1008	575	2347	3000	|	82	80
YEAR 7	"	775	1009	575	2360	3000	|	82	80
YEAR 8	"	785	1010	576	2370	3000	|	82	80
YEAR 9	"	793	1010	576	2380	3000	|	82	80
YEAR 10	"	799	1011	577	2387	3000	|	82	80

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	60	67
POST HUNT YR	2	65	61
POST HUNT YR	3	68	62
POST HUNT YR	4	70	62
POST HUNT YR	5	72	62
POST HUNT YR	6	73	62
POST HUNT YR	7	75	62
POST HUNT YR	8	76	62
POST HUNT YR	9	76	62
POST HUNT YR	10	77	62

MARBLE MOUNTAINS SOUTH ROOSEVELT ELK HERD - SIMULATION RUNS, 2016
Ratio = 60/100/41 - Maximum Calf Survival = 62%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST= BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 30 BULLS AND 30 COWS (INCLUDES COOPERATIVE ELK TAGS)
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 60% bull and 70% antlerless

HERD SIZE	1500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	17	%
% OF BULLS KILLED BY HUNTERS	6.5	%
% OF COWS KILLED BY HUNTERS	4	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	448	746	306	1500	1500	|	15	4
YEAR 1	"	469	743	460	1672	3000	|	30	30
YEAR 2	"	535	783	442	1760	3000	|	30	30
YEAR 3	"	580	809	467	1856	3000	|	30	30
YEAR 4	"	627	840	483	1950	3000	|	30	30
YEAR 5	"	670	873	503	2046	3000	|	30	30
YEAR 6	"	713	909	523	2145	3000	|	30	30
YEAR 7	"	755	947	545	2247	3000	|	30	30
YEAR 8	"	798	987	569	2354	3000	|	30	30
YEAR 9	"	841	1031	594	2466	3000	|	30	30
YEAR 10	"	886	1077	621	2584	3000	|	30	30

		BULL RATIO	CALF RATIO
START		60	41
POST HUNT YR	1	61	65
POST HUNT YR	2	67	59
POST HUNT YR	3	71	60
POST HUNT YR	4	74	60
POST HUNT YR	5	76	60
POST HUNT YR	6	78	59
POST HUNT YR	7	79	59
POST HUNT YR	8	80	59
POST HUNT YR	9	81	59
POST HUNT YR	10	82	59

NORTHEASTERN CALIFORNIA ELK HERD - SIMULATION GENERAL & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION = 12 EITHER SEX TAGS, 10 ANTLERLESS, 15 BULL, 8 PLM RANCH
TO HARVEST APPROX: 20 BULLS, 10 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
APPROXIMATE SUCCESS RATE 60% BULLS & 60% ANTLERLESS

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	12	%
% OF COWS KILLED BY HUNTERS	1.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	136	680	184	1000	1000	|	20	10
YEAR 1	"	170	671	402	1243	3000	|	20	10
YEAR 2	"	288	758	396	1443	3000	|	20	10
YEAR 3	"	382	833	449	1664	3000	|	20	10
YEAR 4	"	480	922	494	1896	3000	|	20	10
YEAR 5	"	580	1019	547	2146	3000	|	20	10
YEAR 6	"	683	1129	606	2417	3000	|	20	10
YEAR 7	"	791	1251	671	2713	3000	|	20	10
YEAR 8	"	907	1387	705	3000	3000	|	20	10
YEAR 9	"	1016	1522	461	3000	3000	|	20	10
YEAR 10	"	1006	1534	460	3000	3000	|	20	10

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	23	61
POST HUNT YR	2	36	53
POST HUNT YR	3	44	55
POST HUNT YR	4	50	54
POST HUNT YR	5	55	54
POST HUNT YR	6	59	54
POST HUNT YR	7	62	54
POST HUNT YR	8	64	51
POST HUNT YR	9	66	30
POST HUNT YR	10	65	30

NORTHEASTERN CALIFORNIA ELK HERD - SIMULATION GENERA, SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED HARVEST = EITHER SEX, ANTLERLESS, BULL, & PLM
TO HARVEST UP TO: 40 BULLS, 40 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
APPROXIMATE SUCCESS RATE 60% BULLS & 60% ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	23.4	%
% OF COWS KILLED BY HUNTERS	5.9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	136	680	184	1000	1000	|	20	10
YEAR 1	"	170	671	402	1243	3000	|	40	40
YEAR 2	"	272	732	379	1383	3000	|	40	40
YEAR 3	"	346	776	416	1537	3000	|	40	40
YEAR 4	"	421	831	442	1694	3000	|	40	40
YEAR 5	"	494	891	475	1860	3000	|	40	40
YEAR 6	"	567	958	511	2036	3000	|	40	40
YEAR 7	"	642	1033	551	2226	3000	|	40	40
YEAR 8	"	719	1117	596	2433	3000	|	40	40
YEAR 9	"	802	1210	646	2659	3000	|	40	40
YEAR 10	"	890	1315	703	2907	3000	|	40	40

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	21	64
POST HUNT YR	2	34	55
POST HUNT YR	3	41	56
POST HUNT YR	4	48	56
POST HUNT YR	5	53	56
POST HUNT YR	6	57	56
POST HUNT YR	7	61	55
POST HUNT YR	8	63	55
POST HUNT YR	9	65	55
POST HUNT YR	10	67	55

NORTHEASTERN CALIFORNIA ELK HERD - SIMULATION GENERAL,SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST = EITHER SEX, ANTLERLESS, BULL TAGS
TO HARVEST UP TO: 60 BULLS, 60 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
APPROXIMATE SUCCESS RATE 60% BULLS & 60% ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	35	%
% OF COWS KILLED BY HUNTERS	8.9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	136	680	184	1000	1000	|	20	10
YEAR 1	"	170	671	402	1243	3000	|	60	60
YEAR 2	"	256	715	367	1337	3000	|	60	60
YEAR 3	"	311	738	393	1442	3000	|	60	60
YEAR 4	"	367	769	407	1544	3000	|	60	60
YEAR 5	"	419	804	426	1648	3000	|	60	60
YEAR 6	"	469	842	446	1758	3000	|	60	60
YEAR 7	"	519	885	469	1873	3000	|	60	60
YEAR 8	"	569	933	495	1997	3000	|	60	60
YEAR 9	"	621	986	524	2130	3000	|	60	60
YEAR 10	"	675	1046	556	2276	3000	|	60	60

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	18	66
POST HUNT YR	2	30	56
POST HUNT YR	3	37	58
POST HUNT YR	4	43	57
POST HUNT YR	5	48	57
POST HUNT YR	6	52	57
POST HUNT YR	7	56	57
POST HUNT YR	8	58	57
POST HUNT YR	9	61	57
POST HUNT YR	10	62	56

NORTHEASTERN CALIFORNIA ELK HERD - SIMULATION GENERAL,SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH = EITHER SEX, ANTLERLESS, BULL TAGS
TO HARVEST UP TO: 61 BULLS, 70 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
APPROXIMATE SUCCESS RATE 60% BULLS & 60% ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags

HERD SIZE	1300	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	27	%
% OF COWS KILLED BY HUNTERS	8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	177	884	239	1300	1300	|	20	10
YEAR 1	"	227	874	525	1626	3000	|	61	70
YEAR 2	"	351	939	483	1772	3000	|	61	70
YEAR 3	"	435	977	521	1934	3000	|	61	70
YEAR 4	"	521	1028	544	2092	3000	|	61	70
YEAR 5	"	600	1082	575	2257	3000	|	61	70
YEAR 6	"	677	1144	607	2428	3000	|	61	70
YEAR 7	"	754	1212	644	2610	3000	|	61	70
YEAR 8	"	832	1288	685	2806	3000	|	61	70
YEAR 9	"	913	1374	713	3000	3000	|	61	70
YEAR 10	"	991	1461	548	3000	3000	|	61	70

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	21	65
POST HUNT YR	2	33	56
POST HUNT YR	3	41	57
POST HUNT YR	4	48	57
POST HUNT YR	5	53	57
POST HUNT YR	6	57	57
POST HUNT YR	7	61	56
POST HUNT YR	8	63	56
POST HUNT YR	9	65	55
POST HUNT YR	10	67	39

NORTHEASTERN CALIFORNIA ELK HERD - SIMULATION GENERAL,SHARE, & PLM 2016
Ratio = 20/100/27 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST = EITHER SEX, ANTLERLESS, BULL TAGS
TO HARVEST UP TO: 20 BULLS, 20 COWS (INCLUDES COOPERATIVE & PLM ELK TAGS)
APPROXIMATE SUCCESS RATE 60% BULLS & 60% ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	12	%
% OF COWS KILLED BY HUNTERS	3	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	136	680	184	1000	1000	|	20	10
YEAR 1	"	170	671	402	1243	3000	|	20	20
YEAR 2	"	288	749	390	1428	3000	|	20	20
YEAR 3	"	379	814	438	1630	3000	|	20	20
YEAR 4	"	474	891	476	1840	3000	|	20	20
YEAR 5	"	567	976	522	2065	3000	|	20	20
YEAR 6	"	662	1071	573	2306	3000	|	20	20
YEAR 7	"	761	1177	630	2568	3000	|	20	20
YEAR 8	"	866	1295	694	2855	3000	|	20	20
YEAR 9	"	978	1427	595	3000	3000	|	20	20
YEAR 10	"	1029	1500	471	3000	3000	|	20	20

		BULL RATIO	CALF RATIO
START		20	27
POST HUNT YR	1	23	62
POST HUNT YR	2	37	54
POST HUNT YR	3	45	55
POST HUNT YR	4	52	55
POST HUNT YR	5	57	55
POST HUNT YR	6	61	55
POST HUNT YR	7	64	54
POST HUNT YR	8	66	54
POST HUNT YR	9	68	42
POST HUNT YR	10	68	32

MENDOCINO TULE ELK MANAGEMENT UNIT (General and PLM) - SIMULATION RUNS, 2016
(INCLUDES PROPOSED MENDOCINO NORTH COAST, MIDDLE FORK, UPPER RUSSIAN RIVER,
LITTLE LAKE, AND SOUTH COAST ZONES)
Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

CURRENT CONDITION: BULL & ANTLERLESS TAGS
HARVEST UP TO 36 BULL & 37 ANTLERLESS
APPROXIMATE SUCCESS RATE: 80% BULL, 75% ANTLERLESS

HERD SIZE	930	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	16.8	%
% OF COWS KILLED BY HUNTERS	7.2	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	218	544	169	930	930	|	36	37
YEAR 1	"	213	520	233	966	1500	|	36	37
YEAR 2	"	235	527	222	984	1500	|	36	37
YEAR 3	"	248	529	225	1002	1500	|	36	37
YEAR 4	"	260	532	226	1018	1500	|	36	37
YEAR 5	"	270	534	227	1032	1500	|	36	37
YEAR 6	"	278	537	229	1044	1500	|	36	37
YEAR 7	"	285	540	230	1056	1500	|	36	37
YEAR 8	"	292	544	231	1067	1500	|	36	37
YEAR 9	"	297	547	233	1078	1500	|	36	37
YEAR 10	"	302	551	235	1088	1500	|	36	37

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	37	48
POST HUNT YR	2	41	45
POST HUNT YR	3	43	46
POST HUNT YR	4	45	46
POST HUNT YR	5	47	46
POST HUNT YR	6	49	46
POST HUNT YR	7	50	46
POST HUNT YR	8	51	46
POST HUNT YR	9	51	46
POST HUNT YR	10	52	46

MENDOCINO NORTH COAST - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

PROPOSED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 18 BULL & 20 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	420	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	18	%
% OF COWS KILLED BY HUNTERS	8.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	98	246	76	420	420	|	13	10
YEAR 1	"	99	241	108	448	1000	|	18	20
YEAR 2	"	108	242	101	451	1000	|	18	20
YEAR 3	"	113	239	102	454	1000	|	18	20
YEAR 4	"	117	237	101	455	1000	|	18	20
YEAR 5	"	119	235	100	455	1000	|	18	20
YEAR 6	"	121	234	99	454	1000	|	18	20
YEAR 7	"	122	232	98	452	1000	|	18	20
YEAR 8	"	123	230	97	450	1000	|	18	20
YEAR 9	"	123	228	97	448	1000	|	18	19
YEAR 10	"	123	226	96	445	1000	|	18	19

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	37	49
POST HUNT YR	2	41	46
POST HUNT YR	3	43	46
POST HUNT YR	4	46	46
POST HUNT YR	5	47	46
POST HUNT YR	6	48	46
POST HUNT YR	7	49	46
POST HUNT YR	8	50	46
POST HUNT YR	9	51	46
POST HUNT YR	10	51	46

MENDOCINO NORTH COAST - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES PLM, AND COOPERATIVE TAGS
HARVEST UP TO 27 BULL & 30 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	420	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	27	%
% OF COWS KILLED BY HUNTERS	12.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	98	246	76	420	420	|	13	10
YEAR 1	"	99	241	108	448	1000	|	27	30
YEAR 2	"	101	233	97	431	1000	|	27	29
YEAR 3	"	98	222	94	414	1000	|	27	28
YEAR 4	"	95	212	89	397	1000	|	27	27
YEAR 5	"	90	203	85	379	1000	|	27	25
YEAR 6	"	85	194	82	361	1000	|	27	24
YEAR 7	"	79	185	78	343	1000	|	21	23
YEAR 8	"	78	177	75	329	1000	|	21	22
YEAR 9	"	75	169	71	315	1000	|	20	21
YEAR 10	"	72	161	68	302	1000	|	20	20

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	34	51
POST HUNT YR	2	36	48
POST HUNT YR	3	37	48
POST HUNT YR	4	37	48
POST HUNT YR	5	36	48
POST HUNT YR	6	34	48
POST HUNT YR	7	36	48
POST HUNT YR	8	37	48
POST HUNT YR	9	37	48
POST HUNT YR	10	37	48

MENDOCINO NORTH COAST - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 28 BULL & 24 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	550	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	21	%
% OF COWS KILLED BY HUNTERS	7.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	129	322	100	550	550	|	13	10
YEAR 1	"	132	318	143	594	1000	|	28	24
YEAR 2	"	141	322	135	598	1000	|	28	24
YEAR 3	"	145	322	137	603	1000	|	28	24
YEAR 4	"	148	322	137	607	1000	|	28	24
YEAR 5	"	151	322	137	611	1000	|	28	24
YEAR 6	"	154	323	137	614	1000	|	28	24
YEAR 7	"	155	323	137	616	1000	|	28	24
YEAR 8	"	157	323	137	618	1000	|	28	24
YEAR 9	"	158	324	138	620	1000	|	28	24
YEAR 10	"	160	324	138	621	1000	|	28	24

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	36	49
POST HUNT YR	2	38	45
POST HUNT YR	3	39	46
POST HUNT YR	4	40	46
POST HUNT YR	5	41	46
POST HUNT YR	6	42	46
POST HUNT YR	7	43	46
POST HUNT YR	8	43	46
POST HUNT YR	9	44	46
POST HUNT YR	10	44	46

MENDOCINO NORTH COAST - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 9 BULL & 10 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	420	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	9	%
% OF COWS KILLED BY HUNTERS	4.2	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	98	246	76	420	420	|	13	10
YEAR 1	"	99	241	108	448	1000	|	9	10
YEAR 2	"	115	251	106	472	1000	|	9	10
YEAR 3	"	127	258	111	497	1000	|	9	10
YEAR 4	"	139	267	114	521	1000	|	9	10
YEAR 5	"	150	277	118	545	1000	|	9	10
YEAR 6	"	160	286	123	569	1000	|	9	10
YEAR 7	"	170	297	127	594	1000	|	9	10
YEAR 8	"	180	308	132	620	1000	|	9	10
YEAR 9	"	190	321	137	647	1000	|	9	10
YEAR 10	"	199	334	143	676	1000	|	9	10

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	39	47
POST HUNT YR	2	44	44
POST HUNT YR	3	48	45
POST HUNT YR	4	51	44
POST HUNT YR	5	53	44
POST HUNT YR	6	55	44
POST HUNT YR	7	56	44
POST HUNT YR	8	57	44
POST HUNT YR	9	58	44
POST HUNT YR	10	59	44

MENDOCINO MIDDLE FORK - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

PROPOSED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 12 BULL & 11 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	250	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	21	%
% OF COWS KILLED BY HUNTERS	8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	58	146	45	250	250	|	12	9
YEAR 1	"	55	141	63	259	500	|	12	11
YEAR 2	"	60	142	60	261	500	|	12	11
YEAR 3	"	63	141	60	264	500	|	12	11
YEAR 4	"	65	141	60	265	500	|	12	11
YEAR 5	"	66	140	59	266	500	|	12	11
YEAR 6	"	68	139	59	266	500	|	12	11
YEAR 7	"	69	139	59	266	500	|	12	11
YEAR 8	"	69	138	59	266	500	|	12	11
YEAR 9	"	69	138	58	266	500	|	12	11
YEAR 10	"	70	137	58	265	500	|	12	11

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	34	49
POST HUNT YR	2	37	46
POST HUNT YR	3	39	46
POST HUNT YR	4	41	46
POST HUNT YR	5	43	46
POST HUNT YR	6	44	46
POST HUNT YR	7	45	46
POST HUNT YR	8	45	46
POST HUNT YR	9	46	46
POST HUNT YR	10	46	46

MENDOCINO MIDDLE FORK - SIMULATION RUNS, GENERAL, SHARE, AND PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 18 BULL & 16 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	250	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	33	%
% OF COWS KILLED BY HUNTERS	11	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	58	146	45	250	250	|	12	9
YEAR 1	"	55	144	63	262	500	|	18	16
YEAR 2	"	55	144	59	257	500	|	18	16
YEAR 3	"	53	142	59	253	500	|	17	16
YEAR 4	"	52	140	58	250	500	|	17	15
YEAR 5	"	51	138	57	246	500	|	17	15
YEAR 6	"	50	136	57	243	500	|	17	15
YEAR 7	"	50	135	56	240	500	|	16	15
YEAR 8	"	49	133	55	237	500	|	16	15
YEAR 9	"	48	131	54	234	500	|	16	14
YEAR 10	"	48	130	54	231	500	|	16	14

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	29	49
POST HUNT YR	2	29	46
POST HUNT YR	3	28	47
POST HUNT YR	4	28	47
POST HUNT YR	5	28	47
POST HUNT YR	6	28	47
POST HUNT YR	7	28	47
POST HUNT YR	8	28	47
POST HUNT YR	9	28	47
POST HUNT YR	10	28	47

MENDOCINO MIDDLE FORK -SIMULATION RUNS, INCLUDES GENERAL, SHARE, AND PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 12 BULL & 16 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	350	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	15	%
% OF COWS KILLED BY HUNTERS	7.8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	82	205	63	350	350	|	12	9
YEAR 1	"	81	200	90	371	500	|	12	16
YEAR 2	"	91	202	85	378	500	|	12	16
YEAR 3	"	97	201	86	384	500	|	12	16
YEAR 4	"	102	201	85	389	500	|	12	16
YEAR 5	"	106	201	85	393	500	|	12	16
YEAR 6	"	109	201	85	395	500	|	12	16
YEAR 7	"	112	200	85	397	500	|	12	16
YEAR 8	"	114	200	85	399	500	|	12	16
YEAR 9	"	115	200	85	400	500	|	12	16
YEAR 10	"	116	199	85	400	500	|	12	16

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	37	49
POST HUNT YR	2	42	46
POST HUNT YR	3	46	46
POST HUNT YR	4	49	46
POST HUNT YR	5	51	46
POST HUNT YR	6	53	46
POST HUNT YR	7	54	46
POST HUNT YR	8	55	46
POST HUNT YR	9	56	46
POST HUNT YR	10	57	46

MENDOCINO MIDDLE FORK - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 6 BULL & 5 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	250	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	11	%
% OF COWS KILLED BY HUNTERS	3.8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	58	146	45	250	250	|	12	9
YEAR 1	"	55	141	63	259	500	|	6	5
YEAR 2	"	65	147	62	274	500	|	6	5
YEAR 3	"	72	152	65	289	500	|	6	5
YEAR 4	"	79	158	67	304	500	|	6	5
YEAR 5	"	85	164	70	319	500	|	6	5
YEAR 6	"	91	170	73	334	500	|	6	5
YEAR 7	"	97	177	76	350	500	|	6	5
YEAR 8	"	103	184	79	367	500	|	6	5
YEAR 9	"	109	192	82	384	500	|	6	5
YEAR 10	"	116	201	86	402	500	|	6	5

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	36	47
POST HUNT YR	2	41	44
POST HUNT YR	3	45	44
POST HUNT YR	4	48	44
POST HUNT YR	5	50	44
POST HUNT YR	6	52	44
POST HUNT YR	7	53	44
POST HUNT YR	8	54	44
POST HUNT YR	9	55	44
POST HUNT YR	10	56	44

MENDOCINO UPPER RUSSIAN - GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

PROPOSED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES PLM & COOPERATIVE TAGS
HARVEST UP TO 12 BULL & 16 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	200	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	25.8	%
% OF COWS KILLED BY HUNTERS	15	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	47	117	36	200	200	|	9	16
YEAR 1	"	45	107	46	198	500	|	12	16
YEAR 2	"	45	103	42	190	500	|	12	15
YEAR 3	"	44	98	40	181	500	|	11	15
YEAR 4	"	42	93	38	173	500	|	11	14
YEAR 5	"	40	88	36	165	500	|	10	13
YEAR 6	"	38	84	34	157	500	|	10	13
YEAR 7	"	37	80	33	149	500	|	9	12
YEAR 8	"	35	76	31	141	500	|	9	11
YEAR 9	"	33	72	30	134	500	|	9	11
YEAR 10	"	31	68	28	127	500	|	8	11

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	36	51
POST HUNT YR	2	38	48
POST HUNT YR	3	39	49
POST HUNT YR	4	39	48
POST HUNT YR	5	40	48
POST HUNT YR	6	40	48
POST HUNT YR	7	40	48
POST HUNT YR	8	40	48
POST HUNT YR	9	41	49
POST HUNT YR	10	41	49

MENDOCINO UPPER RUSSIAN - GENERAL, SHARE, & PLM SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES PLM & COOPERATIVE TAGS
HARVEST UP TO 18 BULL & 24 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	200	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	39.5	%
% OF COWS KILLED BY HUNTERS	22.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	47	117	36	200	200	9	16
YEAR 1	"	45	107	61	212	1000	18	24
YEAR 2	"	46	102	50	198	1000	18	23
YEAR 3	"	42	94	47	183	1000	17	21
YEAR 4	"	39	87	44	170	1000	16	19
YEAR 5	"	36	80	40	157	1000	14	18
YEAR 6	"	34	74	37	145	1000	13	17
YEAR 7	"	31	68	34	134	1000	12	15
YEAR 8	"	29	63	32	124	1000	11	14
YEAR 9	"	27	58	29	114	1000	11	13
YEAR 10	"	25	54	27	106	1000	10	12

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	33	73
POST HUNT YR	2	35	63
POST HUNT YR	3	35	65
POST HUNT YR	4	35	65
POST HUNT YR	5	36	65
POST HUNT YR	6	36	65
POST HUNT YR	7	36	65
POST HUNT YR	8	36	65
POST HUNT YR	9	36	65
POST HUNT YR	10	36	65

MENDOCINO UPPER RUSSIAN - GENERAL, SHARE, & PLM SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL & ANTLERLESS TAGS, INCLUDES PLM & COOPERATIVE TAGS
HARVEST UP TO 18 BULL & 25 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	25.8	%
% OF COWS KILLED BY HUNTERS	15	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	70	175	54	300	300	|	12	16
YEAR 1	"	68	168	96	332	1000	|	18	25
YEAR 2	"	79	172	86	336	1000	|	18	25
YEAR 3	"	83	170	88	341	1000	|	18	25
YEAR 4	"	88	170	87	345	1000	|	18	25
YEAR 5	"	91	170	87	347	1000	|	18	25
YEAR 6	"	93	169	87	349	1000	|	18	25
YEAR 7	"	95	168	86	350	1000	|	18	25
YEAR 8	"	97	168	86	350	1000	|	18	25
YEAR 9	"	98	167	86	350	1000	|	18	25
YEAR 10	"	98	166	85	349	1000	|	18	25

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	35	67
POST HUNT YR	2	42	59
POST HUNT YR	3	45	61
POST HUNT YR	4	48	60
POST HUNT YR	5	51	60
POST HUNT YR	6	53	60
POST HUNT YR	7	54	60
POST HUNT YR	8	55	60
POST HUNT YR	9	56	60
POST HUNT YR	10	57	60

MENDOCINO LITTLE LAKE - SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST
RATES.

PROPOSED HARVEST: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST: 0 - NO HARVEST RECOMMONDED - ESTABLISH ZONE BOUNDARIES

APPROXIMATE HARVEST SUCCESS RATES; 0 BULL, 0 ANTLERLESS

HERD SIZE	20	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	0	%
% OF COWS KILLED BY HUNTERS	0	%

	AU	BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	G	5	12	4	20	20	0	0
YEAR 1	"	5	12	5	22	200	0	0
YEAR 2	"	6	13	5	25	200	0	0
YEAR 3	"	7	14	6	27	200	0	0
YEAR 4	"	8	15	6	29	200	0	0
YEAR 5	"	9	16	7	31	200	0	0
YEAR 6	"	10	17	7	34	200	0	0
YEAR 7	"	11	18	8	36	200	0	0
YEAR 8	"	12	19	8	39	200	0	0
YEAR 9	"	13	20	9	42	200	0	0
YEAR 10	"	14	22	9	45	200	0	0

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	44	45
POST HUNT YR	2	49	43
POST HUNT YR	3	53	43
POST HUNT YR	4	56	43
POST HUNT YR	5	58	43
POST HUNT YR	6	59	43
POST HUNT YR	7	60	43
POST HUNT YR	8	61	43
POST HUNT YR	9	62	43
POST HUNT YR	10	62	43

MENDOCINO LITTLE LAKE - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST: UP TO 5 BULL AND 5 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80% BULL, 75% ANTLERLESS

HERD SIZE	100	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	17.4	%
% OF COWS KILLED BY HUNTERS	7.7	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	23	58	18	100	100	0	0
YEAR 1	"	26	59	27	112	200	5	5
YEAR 2	"	28	60	25	113	200	5	5
YEAR 3	"	29	60	26	114	200	5	5
YEAR 4	"	29	60	25	114	200	5	5
YEAR 5	"	29	60	25	115	200	5	5
YEAR 6	"	30	60	25	115	200	5	5
YEAR 7	"	30	60	25	115	200	5	5
YEAR 8	"	30	60	25	115	200	5	5
YEAR 9	"	30	60	25	115	200	5	5
YEAR 10	"	30	60	25	115	200	5	5

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	39	49
POST HUNT YR	2	42	45
POST HUNT YR	3	43	46
POST HUNT YR	4	43	46
POST HUNT YR	5	44	46
POST HUNT YR	6	44	46
POST HUNT YR	7	45	46
POST HUNT YR	8	45	46
POST HUNT YR	9	45	46
POST HUNT YR	10	45	46

MENDOCINO SOUTH COAST - SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

PROPOSED HARVEST: BULL & ANTLERLESS TAGS,
HARVEST UP TO 1 BULL & 1 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	40	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	6	%
% OF COWS KILLED BY HUNTERS	2.9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	9	23	7	40	40	1	1
YEAR 1	"	10	23	10	43	200	1	1
YEAR 2	"	11	24	10	46	200	1	1
YEAR 3	"	13	25	11	49	200	1	1
YEAR 4	"	14	26	11	51	200	1	1
YEAR 5	"	15	27	12	54	200	1	1
YEAR 6	"	16	28	12	57	200	1	1
YEAR 7	"	18	30	13	60	200	1	1
YEAR 8	"	19	31	13	63	200	1	1
YEAR 9	"	20	32	14	66	200	1	1
YEAR 10	"	21	34	14	69	200	1	1

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	41	46
POST HUNT YR	2	46	44
POST HUNT YR	3	50	44
POST HUNT YR	4	53	44
POST HUNT YR	5	55	44
POST HUNT YR	6	57	44
POST HUNT YR	7	59	44
POST HUNT YR	8	60	44
POST HUNT YR	9	61	44
POST HUNT YR	10	62	44

MENDOCINO SOUTH COAST - SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL & ANTLERLESS TAGS,
HARVEST UP TO 2 BULL & 2 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	40	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	16	%
% OF COWS KILLED BY HUNTERS	7	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	9	23	7	40	40	1	1
YEAR 1	"	10	23	10	43	200	2	2
YEAR 2	"	11	23	10	44	200	2	2
YEAR 3	"	11	23	10	44	200	2	2
YEAR 4	"	12	23	10	45	200	2	2
YEAR 5	"	12	24	10	46	200	2	2
YEAR 6	"	12	24	10	46	200	2	2
YEAR 7	"	13	24	10	47	200	2	2
YEAR 8	"	13	24	10	47	200	2	2
YEAR 9	"	13	24	10	48	200	2	2
YEAR 10	"	14	24	10	48	200	2	2

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	38	48
POST HUNT YR	2	42	45
POST HUNT YR	3	44	46
POST HUNT YR	4	46	46
POST HUNT YR	5	48	46
POST HUNT YR	6	50	46
POST HUNT YR	7	51	46
POST HUNT YR	8	52	46
POST HUNT YR	9	52	46
POST HUNT YR	10	53	46

MENDOCINO SOUTH COAST - SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL & ANTLERLESS TAGS, INCLUDES COOPERATIVE TAGS
HARVEST UP TO 5 BULL & 5 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	100	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	17.9	%
% OF COWS KILLED BY HUNTERS	7.7	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	23	58	18	100	100	1	1
YEAR 1	"	25	59	26	110	200	5	5
YEAR 2	"	27	59	25	111	200	5	5
YEAR 3	"	28	59	25	112	200	5	5
YEAR 4	"	29	59	25	113	200	5	5
YEAR 5	"	30	59	25	114	200	5	5
YEAR 6	"	30	59	25	114	200	5	5
YEAR 7	"	30	59	25	115	200	5	5
YEAR 8	"	31	59	25	115	200	5	5
YEAR 9	"	31	59	25	115	200	5	5
YEAR 10	"	31	59	25	115	200	5	5

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	38	49
POST HUNT YR	2	41	45
POST HUNT YR	3	43	46
POST HUNT YR	4	45	46
POST HUNT YR	5	46	46
POST HUNT YR	6	47	46
POST HUNT YR	7	48	46
POST HUNT YR	8	48	46
POST HUNT YR	9	49	46
POST HUNT YR	10	49	46

MENDOCINO SOUTH COAST - SIMULATION RUNS, 2016

Ratio = 40/100/31, Maximum Calf Survival = 46%
THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS
BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL & ANTLERLESS TAGS,
HARVEST UP TO 1 BULL & 0 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
APPROXIMATE HARVEST SUCCESS RATES; 80 BULL, 75 ANTLERLESS

HERD SIZE	40	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	6	%
% OF COWS KILLED BY HUNTERS	0	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	9	23	7	40	40	|	1	1
YEAR 1	"	10	23	10	43	200	|	1	0
YEAR 2	"	11	25	11	47	200	|	1	0
YEAR 3	"	13	26	11	51	200	|	1	0
YEAR 4	"	14	28	12	55	200	|	1	0
YEAR 5	"	16	30	13	59	200	|	1	0
YEAR 6	"	17	32	14	63	200	|	1	0
YEAR 7	"	19	34	15	68	200	|	1	0
YEAR 8	"	21	37	16	73	200	|	1	0
YEAR 9	"	22	39	17	79	200	|	1	0
YEAR 10	"	24	42	18	85	200	|	1	0

		BULL RATIO	CALF RATIO
START		40	31
POST HUNT YR	1	39	45
POST HUNT YR	2	44	43
POST HUNT YR	3	46	43
POST HUNT YR	4	49	43
POST HUNT YR	5	51	43
POST HUNT YR	6	52	43
POST HUNT YR	7	54	43
POST HUNT YR	8	55	43
POST HUNT YR	9	55	43
POST HUNT YR	10	56	43

CACHE CREEK TULE ELK HERD - SIMULATION RUNS, GENERAL AND SHARE 2016
Ratio = 25/100/51 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: BULL, COW,
TO HARVEST UP TO 4 BULLS & 3 COWS
Various combination of tags to achieved harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	125	ELK
% BULLS LOST TO NON HUNTING CAUSES	40	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	18.4	%
% OF COWS KILLED BY HUNTERS	4	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	18	71	36	125	125	|	3	2
YEAR 1	"	20	70	41	131	200	|	4	3
YEAR 2	"	22	70	40	132	200	|	4	3
YEAR 3	"	23	70	40	133	200	|	4	3
YEAR 4	"	23	70	40	133	200	|	4	3
YEAR 5	"	23	70	40	133	200	|	4	3
YEAR 6	"	24	70	40	133	200	|	4	3
YEAR 7	"	24	70	40	133	200	|	4	3
YEAR 8	"	24	69	40	133	200	|	4	3
YEAR 9	"	24	69	40	133	200	|	4	3
YEAR 10	"	24	69	40	133	200	|	4	3

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	24	62
POST HUNT YR	2	27	60
POST HUNT YR	3	28	60
POST HUNT YR	4	28	60
POST HUNT YR	5	29	60
POST HUNT YR	6	29	60
POST HUNT YR	7	29	60
POST HUNT YR	8	29	60
POST HUNT YR	9	29	60
POST HUNT YR	10	29	60

CACHE CREEK TULE ELK HERD - SIMULATION RUNS, GENERAL AND SHARE 2016
Ratio = 25/100/51 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL, COW,
TO HARVEST UP TO 4 BULLS & 3 COWS
Various combination of tags to achieved harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	125	ELK
% BULLS LOST TO NON HUNTING CAUSES	40	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	18.4	%
% OF COWS KILLED BY HUNTERS	5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	18	71	36	125	125	3	2
YEAR 1	"	20	70	41	131	200	4	3
YEAR 2	"	22	70	40	131	200	4	3
YEAR 3	"	23	69	40	131	200	4	3
YEAR 4	"	23	68	39	130	200	4	3
YEAR 5	"	23	67	39	129	200	4	3
YEAR 6	"	23	67	38	128	200	4	3
YEAR 7	"	23	66	38	127	200	4	3
YEAR 8	"	23	65	38	126	200	4	3
YEAR 9	"	22	65	37	125	200	4	3
YEAR 10	"	22	64	37	123	200	4	3

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	24	63
POST HUNT YR	2	27	60
POST HUNT YR	3	28	61
POST HUNT YR	4	29	61
POST HUNT YR	5	29	61
POST HUNT YR	6	29	61
POST HUNT YR	7	30	61
POST HUNT YR	8	30	61
POST HUNT YR	9	30	61
POST HUNT YR	10	30	61

CACHE CREEK TULE ELK HERD - SIMULATION RUNS, GENERAL AND SHARE 2016
Ratio = 25/100/51 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL, COW,
TO HARVEST UP TO 8 BULLS & 6 COWS
Various combination of tags to achieved harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	125	ELK
% BULLS LOST TO NON HUNTING CAUSES	40	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	39	%
% OF COWS KILLED BY HUNTERS	8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	18	71	36	125	125	3	2
YEAR 1	"	20	70	41	131	200	8	6
YEAR 2	"	20	68	38	126	200	8	5
YEAR 3	"	19	65	37	122	200	7	5
YEAR 4	"	18	63	36	117	200	7	5
YEAR 5	"	17	61	35	113	200	7	5
YEAR 6	"	17	59	34	109	200	7	5
YEAR 7	"	16	57	32	105	200	6	5
YEAR 8	"	16	55	31	102	200	6	4
YEAR 9	"	15	53	30	98	200	6	4
YEAR 10	"	15	51	29	95	200	6	4

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	19	65
POST HUNT YR	2	19	62
POST HUNT YR	3	19	62
POST HUNT YR	4	19	62
POST HUNT YR	5	19	62
POST HUNT YR	6	19	62
POST HUNT YR	7	19	62
POST HUNT YR	8	19	62
POST HUNT YR	9	19	62
POST HUNT YR	10	19	62

CACHE CREEK TULE ELK HERD - SIMULATION RUNS, GENERAL AND SHARE 2016
Ratio = 25/100/51 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL, COW,
TO HARVEST UP TO 5 BULLS & 6 COWS
Various combination of tags to achieved harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	175	ELK
% BULLS LOST TO NON HUNTING CAUSES	40	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	16.8	%
% OF COWS KILLED BY HUNTERS	6.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	25	99	51	175	175	|	3	2
YEAR 1	"	28	98	58	185	200	|	5	6
YEAR 2	"	32	97	55	184	200	|	5	6
YEAR 3	"	32	94	54	181	200	|	5	6
YEAR 4	"	32	92	53	178	200	|	5	6
YEAR 5	"	32	90	52	174	200	|	5	6
YEAR 6	"	32	88	51	171	200	|	5	6
YEAR 7	"	31	86	50	167	200	|	5	6
YEAR 8	"	30	84	48	163	200	|	5	5
YEAR 9	"	30	82	47	159	200	|	5	5
YEAR 10	"	29	81	46	156	200	|	5	5

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	26	64
POST HUNT YR	2	29	61
POST HUNT YR	3	30	62
POST HUNT YR	4	31	61
POST HUNT YR	5	32	61
POST HUNT YR	6	32	61
POST HUNT YR	7	32	61
POST HUNT YR	8	32	61
POST HUNT YR	9	32	61
POST HUNT YR	10	32	61

CACHE CREEK TULE ELK HERD - SIMULATION RUNS, GENERAL AND SHARE 2016
Ratio = 25/100/51 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL, COW,
TO HARVEST UP TO 2 BULLS & 1 COWS
Various combination of tags to achieved harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	125	ELK
% BULLS LOST TO NON HUNTING CAUSES	40	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	7.7	%
% OF COWS KILLED BY HUNTERS	1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	18	71	36	125	125	|	3	2
YEAR 1	"	20	70	41	131	200	|	2	1
YEAR 2	"	23	72	41	137	200	|	2	1
YEAR 3	"	25	73	43	141	200	|	2	1
YEAR 4	"	27	75	44	146	200	|	2	1
YEAR 5	"	28	77	45	150	200	|	2	1
YEAR 6	"	29	79	46	153	200	|	2	1
YEAR 7	"	30	81	47	157	200	|	2	1
YEAR 8	"	31	83	48	161	200	|	2	1
YEAR 9	"	31	85	49	165	200	|	2	1
YEAR 10	"	32	87	50	169	200	|	2	1

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	26	60
POST HUNT YR	2	30	58
POST HUNT YR	3	32	59
POST HUNT YR	4	33	59
POST HUNT YR	5	34	59
POST HUNT YR	6	34	59
POST HUNT YR	7	34	59
POST HUNT YR	8	34	59
POST HUNT YR	9	34	59
POST HUNT YR	10	34	59

LA PANZA - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 26/100/29 - Maximum Calf Survival =67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: BULL & ANTLERLESS (INCLUDES COOPERATIVE)
TO HARVEST UP TO 47 BULL AND 51 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	700	ELK
% BULLS LOST TO NON HUNTING CAUSES	22	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	42	%
% OF COWS KILLED BY HUNTERS	12.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	117	452	131	700	700	|	40	40
YEAR 1	"	111	420	276	807	1250	|	47	51
YEAR 2	"	158	446	247	851	1250	|	47	51
YEAR 3	"	183	457	265	905	1250	|	47	51
YEAR 4	"	210	474	272	955	1250	|	47	51
YEAR 5	"	233	492	283	1008	1250	|	47	51
YEAR 6	"	256	513	295	1064	1250	|	47	51
YEAR 7	"	278	537	309	1124	1250	|	47	51
YEAR 8	"	301	564	325	1190	1250	|	47	51
YEAR 9	"	325	594	330	1250	1250	|	47	51
YEAR 10	"	346	624	280	1250	1250	|	47	51

		BULL RATIO	CALF RATIO
START		26	29
POST HUNT YR	1	18	75
POST HUNT YR	2	28	63
POST HUNT YR	3	34	65
POST HUNT YR	4	38	64
POST HUNT YR	5	42	64
POST HUNT YR	6	45	64
POST HUNT YR	7	48	64
POST HUNT YR	8	50	63
POST HUNT YR	9	51	61
POST HUNT YR	10	52	49

LA PANZA - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 26/100/29 - Maximum Calf Survival =67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL & ANTLERLESS (INCLUDES COOPERATIVE)
TO HARVEST UP TO 50 BULL AND 70 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	700	ELK
% BULLS LOST TO NON HUNTING CAUSES	22	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	45	%
% OF COWS KILLED BY HUNTERS	16.6	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	117	452	131	700	700	|	40	40
YEAR 1	"	111	420	276	807	1250	|	50	70
YEAR 2	"	155	429	235	819	1250	|	50	70
YEAR 3	"	174	420	241	834	1250	|	50	70
YEAR 4	"	190	414	235	839	1250	|	50	70
YEAR 5	"	201	406	231	838	1250	|	50	70
YEAR 6	"	207	398	226	831	1250	|	50	70
YEAR 7	"	211	388	220	819	1250	|	50	70
YEAR 8	"	211	377	213	801	1250	|	50	70
YEAR 9	"	209	364	206	779	1250	|	50	70
YEAR 10	"	204	350	197	751	1250	|	50	70

		BULL RATIO	CALF RATIO
START		26	29
POST HUNT YR	1	18	79
POST HUNT YR	2	29	65
POST HUNT YR	3	35	69
POST HUNT YR	4	41	68
POST HUNT YR	5	45	69
POST HUNT YR	6	48	69
POST HUNT YR	7	50	69
POST HUNT YR	8	52	69
POST HUNT YR	9	54	70
POST HUNT YR	10	55	70

LA PANZA - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 26/100/29 - Maximum Calf Survival =67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL & ANTLERLESS (INCLUDES COOPERATIVE)
TO HARVEST UP TO 75 BULL AND 105 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	700	ELK
% BULLS LOST TO NON HUNTING CAUSES	22	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	67	%
% OF COWS KILLED BY HUNTERS	25	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	117	452	131	700	700	|	40	40
YEAR 1	"	111	420	276	807	1250	|	75	105
YEAR 2	"	136	398	211	746	1250	|	75	100
YEAR 3	"	130	356	200	686	1250	|	75	89
YEAR 4	"	121	323	179	623	1250	|	75	81
YEAR 5	"	106	292	162	560	1250	|	71	73
YEAR 6	"	91	264	147	501	1250	|	61	66
YEAR 7	"	81	239	133	452	1250	|	54	60
YEAR 8	"	72	216	120	408	1250	|	49	54
YEAR 9	"	65	195	109	369	1250	|	44	49
YEAR 10	"	59	177	98	334	1250	|	40	44

		BULL RATIO	CALF RATIO
START		26	29
POST HUNT YR	1	12	88
POST HUNT YR	2	21	71
POST HUNT YR	3	21	75
POST HUNT YR	4	19	74
POST HUNT YR	5	16	74
POST HUNT YR	6	15	74
POST HUNT YR	7	15	74
POST HUNT YR	8	15	74
POST HUNT YR	9	15	74
POST HUNT YR	10	15	74

LA PANZA - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 26/100/29 - Maximum Calf Survival =67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL & ANTLERLESS (INCLUDES COOPERATIVE)
TO HARVEST UP TO 75 BULL AND 100 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	22	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	43.2	%
% OF COWS KILLED BY HUNTERS	16.3	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	168	645	187	1000	1000	|	40	40
YEAR 1	"	173	615	405	1193	1250	|	75	100
YEAR 2	"	235	631	345	1211	1250	|	75	100
YEAR 3	"	259	619	356	1234	1250	|	75	100
YEAR 4	"	283	613	348	1244	1250	|	75	100
YEAR 5	"	298	604	344	1246	1250	|	75	100
YEAR 6	"	308	595	338	1241	1250	|	75	100
YEAR 7	"	314	584	331	1229	1250	|	75	100
YEAR 8	"	316	571	324	1211	1250	|	75	100
YEAR 9	"	315	557	316	1188	1250	|	75	100
YEAR 10	"	310	541	306	1158	1250	|	75	100

		BULL RATIO	CALF RATIO
START		26	29
POST HUNT YR	1	19	79
POST HUNT YR	2	30	65
POST HUNT YR	3	36	69
POST HUNT YR	4	41	68
POST HUNT YR	5	44	68
POST HUNT YR	6	47	68
POST HUNT YR	7	50	69
POST HUNT YR	8	51	69
POST HUNT YR	9	53	69
POST HUNT YR	10	54	69

LA PANZA - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 26/100/29 - Maximum Calf Survival =67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL & ANTLERLESS (INCLUDES COOPERATIVE)
TO HARVEST UP TO 25 BULL AND 35 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	700	ELK
% BULLS LOST TO NON HUNTING CAUSES	22	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	8.3	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	117	452	131	700	700	|	40	40
YEAR 1	"	111	420	276	807	1250	|	25	35
YEAR 2	"	175	460	258	893	1250	|	25	35
YEAR 3	"	218	488	285	991	1250	|	25	35
YEAR 4	"	262	524	303	1090	1250	|	25	35
YEAR 5	"	304	564	328	1195	1250	|	25	35
YEAR 6	"	346	610	295	1250	1250	|	25	35
YEAR 7	"	365	636	249	1250	1250	|	25	35
YEAR 8	"	363	638	249	1250	1250	|	25	35
YEAR 9	"	361	640	249	1250	1250	|	25	35
YEAR 10	"	359	642	248	1250	1250	|	25	35

		BULL RATIO	CALF RATIO
START		26	29
POST HUNT YR	1	23	72
POST HUNT YR	2	35	61
POST HUNT YR	3	43	63
POST HUNT YR	4	49	62
POST HUNT YR	5	53	62
POST HUNT YR	6	56	51
POST HUNT YR	7	57	41
POST HUNT YR	8	56	41
POST HUNT YR	9	56	41
POST HUNT YR	10	55	41

OWENS VALLEY - SIMULATION RUNS, 2016

Ratio = 75/100/22 - Maximum Calf Survival = 50%

THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

(Bishop, Independence, Lone Pine, Tinemaha, Tinemaha. Mtn, West Tinemaha, & Whitney)

CURRENT CONDITION: BULL & ANTLERLESS

TO HARVEST APPROXIMATELY 16 BULL AND 9 ANTLERLESS

Various combination of tags to achieve harvest,

Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	282	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	9	%
% OF BULLS KILLED BY HUNTERS	17.7	%
% OF COWS KILLED BY HUNTERS	6	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	96	131	55	282	282	|	16	0
YEAR 1	"	88	144	66	298	490	|	16	9
YEAR 2	"	86	153	68	308	490	|	15	9
YEAR 3	"	86	163	72	321	490	|	15	9
YEAR 4	"	88	173	77	338	490	|	16	9
YEAR 5	"	91	185	82	357	490	|	16	9
YEAR 6	"	95	197	88	380	490	|	17	9
YEAR 7	"	100	212	94	406	490	|	18	9
YEAR 8	"	106	228	102	436	490	|	19	9
YEAR 9	"	113	246	110	469	490	|	19	9
YEAR 10	"	122	265	102	490	490	|	19	9

		BULL RATIO	CALF RATIO
START		73	42
POST HUNT YR	1	53	48
POST HUNT YR	2	49	47
POST HUNT YR	3	46	47
POST HUNT YR	4	44	47
POST HUNT YR	5	42	47
POST HUNT YR	6	41	47
POST HUNT YR	7	41	46
POST HUNT YR	8	40	46
POST HUNT YR	9	40	46
POST HUNT YR	10	40	40

OWENS VALLEY - SIMULATION RUNS, 2016

Ratio = 75/100/22 - Maximum Calf Survival = 50%

THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

(Bishop, Goodale, Independence, Lone Pine, Tinemaha, Tinemaha Mtn, West Tinemaha, & Whitney)

PROPOSED: BULL & ANTLERLESS

TO HARVEST APPROXIMATELY 25 BULL AND 9 ANTLERLESS

Various combination of tags to achieve harvest,

Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	282	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	9	%
% OF BULLS KILLED BY HUNTERS	28	%
% OF COWS KILLED BY HUNTERS	6	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	96	131	55	282	282	|	16	0
YEAR 1	"	88	144	66	298	490	|	25	9
YEAR 2	"	79	153	68	300	490	|	22	9
YEAR 3	"	74	163	72	309	490	|	21	9
YEAR 4	"	74	173	77	324	490	|	21	9
YEAR 5	"	75	185	82	342	490	|	21	9
YEAR 6	"	78	197	88	363	490	|	22	9
YEAR 7	"	82	212	94	388	490	|	23	9
YEAR 8	"	87	228	102	416	490	|	24	14
YEAR 9	"	93	241	107	441	490	|	24	14
YEAR 10	"	100	255	113	468	490	|	24	15

		BULL RATIO	CALF RATIO
START		73	42
POST HUNT YR	1	47	48
POST HUNT YR	2	39	47
POST HUNT YR	3	35	47
POST HUNT YR	4	32	47
POST HUNT YR	5	31	47
POST HUNT YR	6	30	47
POST HUNT YR	7	29	46
POST HUNT YR	8	29	47
POST HUNT YR	9	30	47
POST HUNT YR	10	32	47

OWENS VALLEY - SIMULATION RUNS, 2016

Ratio = 75/100/22 - Maximum Calf Survival = 50%

THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

(Bishop, Goodale, Independence, Lone Pine, Tinemaha, Tinemaha Mtn, West Tinemaha, & Whitney)

INCREASED HARVEST: BULL & ANTLERLESS

TO HARVEST APPROXIMATELY 37 BULL AND 13 ANTLERLESS

Various combination of tags to achieve harvest,

Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	282	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	9	%
% OF BULLS KILLED BY HUNTERS	42	%
% OF COWS KILLED BY HUNTERS	9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	96	131	55	282	282	|	16	0
YEAR 1	"	88	144	66	298	490	|	37	13
YEAR 2	"	69	149	66	284	490	|	29	13
YEAR 3	"	60	154	68	281	490	|	25	14
YEAR 4	"	56	158	70	284	490	|	24	14
YEAR 5	"	55	163	72	290	490	|	23	15
YEAR 6	"	56	168	74	297	490	|	23	15
YEAR 7	"	57	172	76	306	490	|	24	16
YEAR 8	"	58	177	78	314	490	|	25	16
YEAR 9	"	60	183	81	323	490	|	25	16
YEAR 10	"	62	188	83	333	490	|	26	17

		BULL RATIO	CALF RATIO
START		73	42
POST HUNT YR	1	39	50
POST HUNT YR	2	29	48
POST HUNT YR	3	25	49
POST HUNT YR	4	23	49
POST HUNT YR	5	22	49
POST HUNT YR	6	21	49
POST HUNT YR	7	21	49
POST HUNT YR	8	21	49
POST HUNT YR	9	21	49
POST HUNT YR	10	21	49

OWENS VALLEY - SIMULATION RUNS, 2016

Ratio = 75/100/22 - Maximum Calf Survival = 50%

THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

(Bishop, Goodale, Independence, Lone Pine, Tinemaha, Tinemaha Mtn, West Tinemaha, & Whitney)

HERD GROWTH: BULL & ANTLERLESS

TO HARVEST APPROXIMATELY 33 BULL AND 33 ANTLERLESS

Various combination of tags to achieve harvest,

Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	490	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	9	%
% OF BULLS KILLED BY HUNTERS	20	%
% OF COWS KILLED BY HUNTERS	13	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	166	228	96	490	490	|	16	0
YEAR 1	"	163	251	77	490	490	|	33	33
YEAR 2	"	138	233	109	481	490	|	28	30
YEAR 3	"	135	235	102	471	490	|	27	30
YEAR 4	"	130	232	102	464	490	|	26	30
YEAR 5	"	127	230	101	458	490	|	25	30
YEAR 6	"	125	228	100	453	490	|	25	30
YEAR 7	"	123	226	99	448	490	|	25	29
YEAR 8	"	121	224	98	444	490	|	24	29
YEAR 9	"	120	222	97	439	490	|	24	29
YEAR 10	"	118	220	97	435	490	|	24	29

		BULL RATIO	CALF RATIO
START		73	42
POST HUNT YR	1	60	35
POST HUNT YR	2	54	54
POST HUNT YR	3	53	50
POST HUNT YR	4	52	51
POST HUNT YR	5	51	50
POST HUNT YR	6	50	50
POST HUNT YR	7	50	50
POST HUNT YR	8	50	50
POST HUNT YR	9	49	50
POST HUNT YR	10	49	50

OWENS VALLEY - SIMULATION RUNS, 2016

Ratio = 75/100/22 - Maximum Calf Survival = 50%

THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

(Bishop, Goodale, Independence, Lone Pine, Tinemaha, Tinemaha Mtn, West Tinemaha, & Whitney)

REDUCED: BULL & ANTLERLESS

TO HARVEST APPROXIMATELY 12 BULL AND 4 ANTLERLESS

Various combination of tags to achieve harvest,

Assuming success rate of 80% bull and 70% antlerless

HERD SIZE	282	ELK
% BULLS LOST TO NON HUNTING CAUSES	18	%
% COWS LOST TO NON HUNTING CAUSES	9	%
% OF BULLS KILLED BY HUNTERS	14	%
% OF COWS KILLED BY HUNTERS	3	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	96	131	55	282	282	|	16	0
YEAR 1	"	88	144	66	298	490	|	12	4
YEAR 2	"	89	157	70	316	490	|	12	4
YEAR 3	"	91	171	76	339	490	|	13	4
YEAR 4	"	96	187	83	366	490	|	13	4
YEAR 5	"	102	204	91	397	490	|	14	4
YEAR 6	"	109	223	100	432	490	|	15	4
YEAR 7	"	118	244	109	471	490	|	16	4
YEAR 8	"	128	268	94	490	490	|	18	4
YEAR 9	"	129	283	78	490	490	|	18	4
YEAR 10	"	123	289	78	490	490	|	17	4

		BULL RATIO	CALF RATIO
START		73	42
POST HUNT YR	1	54	47
POST HUNT YR	2	50	46
POST HUNT YR	3	47	46
POST HUNT YR	4	45	46
POST HUNT YR	5	44	46
POST HUNT YR	6	43	46
POST HUNT YR	7	42	46
POST HUNT YR	8	42	36
POST HUNT YR	9	40	28
POST HUNT YR	10	37	27

GRIZZLY ISLAND - SIMULATION RUNS, 2016

Ratio = 50/100/50 - Maximum Calf Survival =70%

THIS PROGRAM CALCULATES CHANGES IN HERD CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

CURRENT CONDITION: BULL, SPIKE, & ANTLERLESS
TO HARVEST UP TO 18 BULL AND 40 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 95% bull and 95% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	5	%
% COWS LOST TO NON HUNTING CAUSES	2	%
% OF BULLS KILLED BY HUNTERS	19.5	%
% OF COWS KILLED BY HUNTERS	28	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	75	150	75	300	300	|	18	40
YEAR 1	"	90	145	77	311	400	|	18	40
YEAR 2	"	105	140	73	318	400	|	18	39
YEAR 3	"	118	134	70	323	400	|	18	38
YEAR 4	"	129	129	68	326	400	|	18	36
YEAR 5	"	138	124	65	327	400	|	18	35
YEAR 6	"	145	120	63	328	400	|	18	34
YEAR 7	"	151	115	60	327	400	|	18	32
YEAR 8	"	156	111	58	325	400	|	18	31
YEAR 9	"	159	107	56	321	400	|	18	30
YEAR 10	"	161	103	54	317	400	|	18	29

		BULL RATIO	CALF RATIO
START		50	50
POST HUNT YR	1	69	74
POST HUNT YR	2	87	72
POST HUNT YR	3	104	73
POST HUNT YR	4	120	73
POST HUNT YR	5	134	73
POST HUNT YR	6	148	73
POST HUNT YR	7	161	73
POST HUNT YR	8	173	73
POST HUNT YR	9	184	73
POST HUNT YR	10	194	73

GRIZZLY ISLAND - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 50/100/50 - Maximum Calf Survival =70%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

PROPOSED HARVEST: BULL, SPIKE, & ANTLERLESS
TO HARVEST UP TO 32 BULL AND 70 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 95% bull and 95% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	5	%
% COWS LOST TO NON HUNTING CAUSES	2	%
% OF BULLS KILLED BY HUNTERS	35.5	%
% OF COWS KILLED BY HUNTERS	48.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	75	150	75	300	300	|	18	40
YEAR 1	"	90	145	77	311	400	|	32	70
YEAR 2	"	92	111	52	254	400	|	32	54
YEAR 3	"	81	81	40	203	400	|	29	39
YEAR 4	"	69	61	29	159	400	|	24	29
YEAR 5	"	56	45	22	123	400	|	20	22
YEAR 6	"	45	33	16	94	400	|	16	16
YEAR 7	"	35	25	12	72	400	|	12	12
YEAR 8	"	27	18	9	55	400	|	10	9
YEAR 9	"	21	14	7	41	400	|	7	7
YEAR 10	"	16	10	5	31	400	|	6	5

		BULL RATIO	CALF RATIO
START		50	50
POST HUNT YR	1	78	103
POST HUNT YR	2	105	91
POST HUNT YR	3	125	95
POST HUNT YR	4	142	94
POST HUNT YR	5	156	94
POST HUNT YR	6	168	94
POST HUNT YR	7	177	94
POST HUNT YR	8	185	94
POST HUNT YR	9	192	94
POST HUNT YR	10	197	94

GRIZZLY ISLAND - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 50/100/50 - Maximum Calf Survival =70%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

INCREASED HARVEST: BULL, SPIKE, & ANTLERLESS
TO HARVEST UP TO 48 BULL AND 72 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 95% bull and 95% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	5	%
% COWS LOST TO NON HUNTING CAUSES	2	%
% OF BULLS KILLED BY HUNTERS	53	%
% OF COWS KILLED BY HUNTERS	50	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	75	150	75	300	300	|	18	40
YEAR 1	"	90	145	77	311	400	|	48	72
YEAR 2	"	77	109	51	236	400	|	41	54
YEAR 3	"	58	78	38	174	400	|	31	39
YEAR 4	"	44	57	27	128	400	|	23	28
YEAR 5	"	33	41	20	94	400	|	17	21
YEAR 6	"	24	30	14	68	400	|	13	15
YEAR 7	"	18	22	10	50	400	|	9	11
YEAR 8	"	13	16	8	36	400	|	7	8
YEAR 9	"	9	11	6	26	400	|	5	6
YEAR 10	"	7	8	4	19	400	|	4	4

		BULL RATIO	CALF RATIO
START		50	50
POST HUNT YR	1	58	107
POST HUNT YR	2	66	93
POST HUNT YR	3	70	97
POST HUNT YR	4	73	96
POST HUNT YR	5	74	97
POST HUNT YR	6	75	96
POST HUNT YR	7	76	96
POST HUNT YR	8	76	96
POST HUNT YR	9	77	96
POST HUNT YR	10	77	96

GRIZZLY ISLAND - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 50/100/50 - Maximum Calf Survival =70%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

HERD GROWTH: BULL, SPIKE, & ANTLERLESS
TO HARVEST UP TO 50 BULL AND 113 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 95% bull and 95% antlerless

HERD SIZE	450	ELK
% BULLS LOST TO NON HUNTING CAUSES	5	%
% COWS LOST TO NON HUNTING CAUSES	2	%
% OF BULLS KILLED BY HUNTERS	35	%
% OF COWS KILLED BY HUNTERS	48	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	113	225	113	450	450	|	18	40
YEAR 1	"	143	236	70	450	450	|	50	113
YEAR 2	"	122	155	86	363	450	|	43	74
YEAR 3	"	116	121	56	294	450	|	41	58
YEAR 4	"	98	89	44	232	450	|	34	43
YEAR 5	"	82	67	33	181	450	|	29	32
YEAR 6	"	66	50	24	141	450	|	23	24
YEAR 7	"	52	38	18	108	450	|	18	18
YEAR 8	"	41	28	14	83	450	|	14	13
YEAR 9	"	32	21	10	63	450	|	11	10
YEAR 10	"	24	16	8	48	450	|	9	8

		BULL RATIO	CALF RATIO
START		50	50
POST HUNT YR	1	76	57
POST HUNT YR	2	98	107
POST HUNT YR	3	120	90
POST HUNT YR	4	138	95
POST HUNT YR	5	152	93
POST HUNT YR	6	164	94
POST HUNT YR	7	174	94
POST HUNT YR	8	182	94
POST HUNT YR	9	189	94
POST HUNT YR	10	195	94

GRIZZLY ISLAND - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 50/100/50 - Maximum Calf Survival =70%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST
RATES.

REDUCED HARVEST: BULL, SPIKE, & ANTLERLESS
TO HARVEST UP TO 16 BULL AND 32 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 95% bull and 95% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	5	%
% COWS LOST TO NON HUNTING CAUSES	2	%
% OF BULLS KILLED BY HUNTERS	17.5	%
% OF COWS KILLED BY HUNTERS	24	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	75	150	75	300	300	|	18	40
YEAR 1	"	90	145	77	311	400	|	16	35
YEAR 2	"	107	145	77	329	400	|	16	35
YEAR 3	"	123	146	77	347	400	|	16	35
YEAR 4	"	139	147	78	364	400	|	16	35
YEAR 5	"	154	149	79	381	400	|	16	35
YEAR 6	"	169	150	80	399	400	|	16	35
YEAR 7	"	183	152	64	400	400	|	16	35
YEAR 8	"	190	147	63	400	400	|	16	35
YEAR 9	"	196	141	64	400	400	|	16	35
YEAR 10	"	201	135	64	400	400	|	16	35

		BULL RATIO	CALF RATIO
START		50	50
POST HUNT YR	1	67	70
POST HUNT YR	2	82	69
POST HUNT YR	3	96	70
POST HUNT YR	4	109	69
POST HUNT YR	5	122	69
POST HUNT YR	6	133	69
POST HUNT YR	7	143	55
POST HUNT YR	8	155	57
POST HUNT YR	9	169	60
POST HUNT YR	10	184	63

FORT HUNTER LIGGETT BASE ONLY - SIMULATION RUNS, 2016
Ratio = 41/100/40 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: UP TO 17 BULL AND 43 ANTLERLESS
NO CHANGE: HARVEST UP TO 17 BULL AND 43 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	450	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	7	%
% OF BULLS KILLED BY HUNTERS	16	%
% OF COWS KILLED BY HUNTERS	16	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	102	249	99	450	450	|	10	8
YEAR 1	"	106	270	124	500	500	|	17	43
YEAR 2	"	113	268	118	500	500	|	17	43
YEAR 3	"	117	265	119	500	500	|	17	42
YEAR 4	"	119	262	119	500	500	|	17	42
YEAR 5	"	121	260	119	500	500	|	17	42
YEAR 6	"	123	258	119	500	500	|	17	41
YEAR 7	"	124	257	119	500	500	|	17	41
YEAR 8	"	125	256	119	500	500	|	17	41
YEAR 9	"	125	255	119	500	500	|	17	41
YEAR 10	"	126	255	119	500	500	|	17	41

		BULL RATIO	CALF RATIO
START		41	40
POST HUNT YR	1	39	55
POST HUNT YR	2	43	52
POST HUNT YR	3	45	53
POST HUNT YR	4	46	54
POST HUNT YR	5	48	54
POST HUNT YR	6	49	55
POST HUNT YR	7	50	55
POST HUNT YR	8	50	55
POST HUNT YR	9	51	55
POST HUNT YR	10	51	56

FORT HUNTER LIGGETT CENTRAL COAST - SIMULATION RUNS, GENERAL AND PLM, 2016
Ratio = 41/100/40 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL, ANTLERLESS, EITHER-SEX (INCLUDING COOPERATIVE)
TO HARVEST UP TO 40 BULL AND 70 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	825	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	15	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	187	456	182	825	825	|	37	27
YEAR 1	"	181	468	257	906	1000	|	40	70
YEAR 2	"	202	474	239	915	1000	|	40	70
YEAR 3	"	211	471	242	924	1000	|	40	70
YEAR 4	"	219	469	240	929	1000	|	40	70
YEAR 5	"	225	467	239	932	1000	|	40	70
YEAR 6	"	229	465	238	932	1000	|	40	70
YEAR 7	"	231	463	237	931	1000	|	40	70
YEAR 8	"	232	460	236	928	1000	|	40	70
YEAR 9	"	233	457	234	923	1000	|	40	70
YEAR 10	"	232	453	232	917	1000	|	40	70

		BULL RATIO	CALF RATIO
START		41	40
POST HUNT YR	1	35	65
POST HUNT YR	2	40	59
POST HUNT YR	3	43	60
POST HUNT YR	4	45	60
POST HUNT YR	5	47	60
POST HUNT YR	6	48	60
POST HUNT YR	7	49	60
POST HUNT YR	8	49	60
POST HUNT YR	9	50	60
POST HUNT YR	10	50	61

FORT HUNTER LIGGETT CENTRAL COAST - SIMULATION RUNS, GENERAL AND PLM, 2016
Ratio = 41/100/40 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL, ANTLERLESS, EITHER-SEX (INCLUDING COOPERATIVE)
TO HARVEST UP TO 60 BULL AND 105 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	825	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	33	%
% OF COWS KILLED BY HUNTERS	22.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	187	456	182	825	825	|	37	27
YEAR 1	"	181	468	257	906	1000	|	60	105
YEAR 2	"	187	442	218	847	1000	|	62	99
YEAR 3	"	176	406	206	788	1000	|	58	91
YEAR 4	"	165	376	189	730	1000	|	55	85
YEAR 5	"	154	347	175	676	1000	|	51	78
YEAR 6	"	143	321	161	625	1000	|	47	72
YEAR 7	"	132	296	149	578	1000	|	44	67
YEAR 8	"	122	274	138	534	1000	|	40	62
YEAR 9	"	113	253	127	494	1000	|	37	57
YEAR 10	"	105	234	118	456	1000	|	35	53

		BULL RATIO	CALF RATIO
START		41	40
POST HUNT YR	1	33	71
POST HUNT YR	2	37	63
POST HUNT YR	3	37	65
POST HUNT YR	4	38	65
POST HUNT YR	5	38	65
POST HUNT YR	6	39	65
POST HUNT YR	7	39	65
POST HUNT YR	8	39	65
POST HUNT YR	9	39	65
POST HUNT YR	10	39	65

FORT HUNTER LIGGETT CENTRAL COAST - SIMULATION RUNS, GENERAL AND PLM, 2016
Ratio = 41/100/40 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL, ANTLERLESS, EITHER-SEX (INCLUDING COOPERATIVE)
TO HARVEST UP TO 50 BULL AND 86 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	1000	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	15	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	227	552	221	1000	1000	|	37	27
YEAR 1	"	225	572	203	1000	1000	|	50	86
YEAR 2	"	208	529	263	1000	1000	|	46	79
YEAR 3	"	220	523	257	1000	1000	|	48	78
YEAR 4	"	225	516	259	1000	1000	|	50	77
YEAR 5	"	229	511	260	1000	1000	|	50	77
YEAR 6	"	231	508	261	1000	1000	|	51	76
YEAR 7	"	233	506	259	998	1000	|	51	76
YEAR 8	"	234	504	258	995	1000	|	51	76
YEAR 9	"	233	501	257	992	1000	|	51	75
YEAR 10	"	233	499	256	988	1000	|	51	75

		BULL RATIO	CALF RATIO
START		41	40
POST HUNT YR	1	36	42
POST HUNT YR	2	36	59
POST HUNT YR	3	39	58
POST HUNT YR	4	40	59
POST HUNT YR	5	41	60
POST HUNT YR	6	42	60
POST HUNT YR	7	42	60
POST HUNT YR	8	43	60
POST HUNT YR	9	43	60
POST HUNT YR	10	43	60

FORT HUNTER LIGGETT CENTRAL COAST - SIMULATION RUNS, GENERAL AND PLM, 2016
Ratio = 41/100/40 - Maximum Calf Survival = 60%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL, ANTLERLESS, EITHER-SEX (INCLUDING COOPERATIVE)
TO HARVEST UP TO 20 BULL AND 35 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	825	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	11	%
% OF COWS KILLED BY HUNTERS	7.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	187	456	182	825	825	|	37	27
YEAR 1	"	181	468	257	906	1000	|	20	35
YEAR 2	"	217	505	260	982	1000	|	20	35
YEAR 3	"	245	540	215	1000	1000	|	20	35
YEAR 4	"	250	551	199	1000	1000	|	20	35
YEAR 5	"	247	554	199	1000	1000	|	20	35
YEAR 6	"	245	557	198	1000	1000	|	20	35
YEAR 7	"	243	559	198	1000	1000	|	20	35
YEAR 8	"	242	560	198	1000	1000	|	20	35
YEAR 9	"	241	562	198	1000	1000	|	20	35
YEAR 10	"	240	563	197	1000	1000	|	20	35

		BULL RATIO	CALF RATIO
START		41	40
POST HUNT YR	1	37	59
POST HUNT YR	2	42	55
POST HUNT YR	3	45	42
POST HUNT YR	4	45	39
POST HUNT YR	5	44	38
POST HUNT YR	6	43	38
POST HUNT YR	7	43	38
POST HUNT YR	8	42	38
POST HUNT YR	9	42	38
POST HUNT YR	10	42	37

EAST PARK RESERVOIR TULE ELK HERD - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016

Ratio = 25/100/36 - Maximum Calf Survival = 67%

THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

CURRENT CONDITION: BULL, COW,
TO HARVEST UP TO 2 BULLS & 4 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 90% bull and 75% antlerless

HERD SIZE	120	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	10	%
% OF COWS KILLED BY HUNTERS	4.8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	19	75	27	120	120	|	2	2
YEAR 1	"	21	73	49	143	200	|	2	4
YEAR 2	"	30	80	47	157	200	|	2	4
YEAR 3	"	36	85	51	172	200	|	2	4
YEAR 4	"	42	91	54	187	200	|	2	4
YEAR 5	"	47	97	56	200	200	|	2	4
YEAR 6	"	51	103	46	200	200	|	2	4
YEAR 7	"	50	104	46	200	200	|	2	4
YEAR 8	"	50	105	45	200	200	|	2	4
YEAR 9	"	49	106	45	200	200	|	2	4
YEAR 10	"	49	106	45	200	200	|	2	4

		BULL RATIO	CALF RATIO
START		25	36
POST HUNT YR	1	27	70
POST HUNT YR	2	37	61
POST HUNT YR	3	42	63
POST HUNT YR	4	45	62
POST HUNT YR	5	48	60
POST HUNT YR	6	49	46
POST HUNT YR	7	48	45
POST HUNT YR	8	47	45
POST HUNT YR	9	46	44
POST HUNT YR	10	45	44

EAST PARK RESERVOIR TULE ELK HERD - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 25/100/36 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

PROPOSED: BULL, COW,
TO HARVEST UP TO 4 BULLS & 10 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 90% bull and 75% antlerless

HERD SIZE	120	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	20	%
% OF COWS KILLED BY HUNTERS	13.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	19	75	27	120	120	2	2
YEAR 1	"	21	73	49	143	200	4	10
YEAR 2	"	29	74	42	145	200	4	10
YEAR 3	"	32	73	43	148	200	4	10
YEAR 4	"	35	72	42	149	200	4	10
YEAR 5	"	36	71	42	148	200	4	10
YEAR 6	"	37	69	41	147	200	4	10
YEAR 7	"	37	68	40	145	200	4	10
YEAR 8	"	37	66	39	142	200	4	10
YEAR 9	"	37	64	38	139	200	4	10
YEAR 10	"	36	62	37	135	200	4	10

		BULL RATIO	CALF RATIO
START		25	36
POST HUNT YR	1	27	77
POST HUNT YR	2	38	66
POST HUNT YR	3	44	69
POST HUNT YR	4	49	68
POST HUNT YR	5	52	68
POST HUNT YR	6	55	68
POST HUNT YR	7	57	69
POST HUNT YR	8	58	69
POST HUNT YR	9	59	69
POST HUNT YR	10	60	70

EAST PARK RESERVOIR TULE ELK HERD - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 25/100/36 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL, COW, INCLUDES COOPERATIVE TAGS
TO HARVEST UP TO 6 BULLS & 15 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 90% bull and 75% antlerless

HERD SIZE	120	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	27	%
% OF COWS KILLED BY HUNTERS	20	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	19	75	27	120	120	2	2
YEAR 1	"	21	73	49	143	200	6	15
YEAR 2	"	28	70	39	137	200	6	15
YEAR 3	"	29	64	37	131	200	6	15
YEAR 4	"	30	58	33	120	200	6	15
YEAR 5	"	28	51	29	108	200	6	15
YEAR 6	"	26	43	24	93	200	6	15
YEAR 7	"	23	35	19	76	200	6	15
YEAR 8	"	19	25	13	57	200	6	15
YEAR 9	"	14	15	7	35	200	6	15
YEAR 10	"	8	3	0	11	200	6	15

		BULL RATIO	CALF RATIO
START		25	36
POST HUNT YR	1	26	83
POST HUNT YR	2	40	70
POST HUNT YR	3	48	76
POST HUNT YR	4	55	77
POST HUNT YR	5	62	80
POST HUNT YR	6	71	85
POST HUNT YR	7	85	96
POST HUNT YR	8	124	128
POST HUNT YR	9	-8983	-7821
POST HUNT YR	10	-20	1

EAST PARK RESERVOIR TULE ELK HERD - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 25/100/36 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL, COW TAGS
TO HARVEST UP TO 8 BULLS & 15 COWS
Various combination of tags to achieved harvest,includes cooperative tags
Assuming success rate of 90% bull and 75% antlerless

HERD SIZE	200	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	11.9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	31	124	45	200	200	2	2
YEAR 1	"	36	123	82	241	250	8	15
YEAR 2	"	48	127	73	248	250	8	15
YEAR 3	"	54	126	70	250	250	8	15
YEAR 4	"	57	125	69	250	250	8	15
YEAR 5	"	58	123	69	250	250	8	15
YEAR 6	"	59	121	69	250	250	8	15
YEAR 7	"	60	120	70	250	250	8	15
YEAR 8	"	61	119	70	250	250	8	15
YEAR 9	"	62	119	70	250	250	8	15
YEAR 10	"	62	118	70	250	250	8	15

		BULL RATIO	CALF RATIO
START		25	36
POST HUNT YR	1	26	76
POST HUNT YR	2	36	65
POST HUNT YR	3	41	63
POST HUNT YR	4	44	63
POST HUNT YR	5	46	64
POST HUNT YR	6	48	65
POST HUNT YR	7	50	66
POST HUNT YR	8	51	67
POST HUNT YR	9	52	67
POST HUNT YR	10	52	67

EAST PARK RESERVOIR TULE ELK HERD - SIMULATION RUNS,
GENERAL, SHARE, & PLM 2016
Ratio = 25/100/36 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL, COW,
TO HARVEST UP TO 2 BULLS & 5 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 90% bull and 75% antlerless

HERD SIZE	120	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	10	%
% OF COWS KILLED BY HUNTERS	7	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	19	75	27	120	120	2	2
YEAR 1	"	21	73	49	143	200	2	5
YEAR 2	"	30	78	46	154	200	2	5
YEAR 3	"	36	82	49	166	200	2	5
YEAR 4	"	41	86	51	178	200	2	5
YEAR 5	"	45	90	54	190	200	2	5
YEAR 6	"	49	96	55	200	200	2	5
YEAR 7	"	52	100	47	200	200	2	5
YEAR 8	"	52	101	47	200	200	2	5
YEAR 9	"	51	102	47	200	200	2	5
YEAR 10	"	51	102	47	200	200	2	5

		BULL RATIO	CALF RATIO
START		25	36
POST HUNT YR	1	28	72
POST HUNT YR	2	38	62
POST HUNT YR	3	44	64
POST HUNT YR	4	48	63
POST HUNT YR	5	50	63
POST HUNT YR	6	52	61
POST HUNT YR	7	53	50
POST HUNT YR	8	52	49
POST HUNT YR	9	51	49
POST HUNT YR	10	50	48

SAN LUIS RESERVOIR - SIMULATION RUNS, GENERAL,
SHARE, & PLM 2016
Ratio = 22/100/32 - Maximum Calf Survival = 50%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: EITHER-SEX
TO HARVEST UP TO 5 BULL/ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	390	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	6	%
% OF COWS KILLED BY HUNTERS	0.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	56	253	81	390	390	|	5	0
YEAR 1	"	68	264	127	459	800	|	4	1
YEAR 2	"	96	294	132	521	800	|	4	1
YEAR 3	"	118	322	146	587	800	|	4	1
YEAR 4	"	140	355	161	656	800	|	4	1
YEAR 5	"	162	390	177	729	800	|	4	1
YEAR 6	"	185	430	185	800	800	|	4	1
YEAR 7	"	205	469	126	800	800	|	4	1
YEAR 8	"	198	477	124	800	800	|	4	1
YEAR 9	"	192	485	123	800	800	|	4	1
YEAR 10	"	187	490	122	800	800	|	4	1

		BULL RATIO	CALF RATIO
START		22	32
POST HUNT YR	1	24	48
POST HUNT YR	2	31	45
POST HUNT YR	3	35	46
POST HUNT YR	4	39	45
POST HUNT YR	5	41	45
POST HUNT YR	6	42	43
POST HUNT YR	7	43	27
POST HUNT YR	8	41	26
POST HUNT YR	9	39	26
POST HUNT YR	10	37	25

SAN LUIS RESERVOIR - SIMULATION RUNS.
General, SHARE,& PLM 2016
Ratio = 22/100/32 - Maximum Calf Survival = 50%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 15 BULL AND 30 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	390	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	11.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	56	253	81	390	390	|	5	0
YEAR 1	"	68	264	127	459	800	|	15	30
YEAR 2	"	88	268	117	472	800	|	15	30
YEAR 3	"	98	266	119	483	800	|	15	30
YEAR 4	"	107	265	118	490	800	|	15	30
YEAR 5	"	113	265	118	495	800	|	15	30
YEAR 6	"	118	264	117	498	800	|	15	30
YEAR 7	"	121	263	117	500	800	|	15	30
YEAR 8	"	123	261	116	501	800	|	15	30
YEAR 9	"	125	260	116	500	800	|	15	30
YEAR 10	"	125	259	115	499	800	|	15	30

		BULL RATIO	CALF RATIO
START		22	32
POST HUNT YR	1	23	54
POST HUNT YR	2	31	49
POST HUNT YR	3	35	50
POST HUNT YR	4	39	50
POST HUNT YR	5	42	50
POST HUNT YR	6	44	50
POST HUNT YR	7	46	50
POST HUNT YR	8	47	50
POST HUNT YR	9	48	50
POST HUNT YR	10	48	50

SAN LUIS RESERVOIR - SIMULATION RUNS,
General, SHARE,& PLM 2016 2016
Ratio = 22/100/32 - Maximum Calf Survival = 50%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HAREST: BULL, ANTLERLESS, EITHER-SEX
TO HARVEST UP TO 22 BULL & 45 ANTLERLESS (INCLUDES COOPERATIVE)
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	390	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	32	%
% OF COWS KILLED BY HUNTERS	17	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	56	253	81	390	390	|	5	0
YEAR 1	"	68	264	127	459	800	|	22	45
YEAR 2	"	82	254	110	447	800	|	22	43
YEAR 3	"	87	239	106	432	800	|	22	41
YEAR 4	"	88	226	99	414	800	|	22	38
YEAR 5	"	87	214	94	395	800	|	22	36
YEAR 6	"	84	202	89	375	800	|	22	34
YEAR 7	"	80	191	84	355	800	|	22	32
YEAR 8	"	75	180	79	334	800	|	22	31
YEAR 9	"	69	170	75	315	800	|	22	29
YEAR 10	"	63	161	71	295	800	|	20	27

		BULL RATIO	CALF RATIO
START		22	32
POST HUNT YR	1	21	58
POST HUNT YR	2	29	52
POST HUNT YR	3	33	53
POST HUNT YR	4	35	53
POST HUNT YR	5	37	53
POST HUNT YR	6	37	53
POST HUNT YR	7	37	53
POST HUNT YR	8	35	53
POST HUNT YR	9	33	53
POST HUNT YR	10	32	53

SAN LUIS RESERVOIR - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 22/100/32 - Maximum Calf Survival = 50%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL, ANTLERLESS, EITHER-SEX
TO HARVEST UP TO 24 BULL & 45 ANTLERLESS (INCLUDES COOPERATIVE)
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	600	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	11	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	86	390	125	600	600	|	5	0
YEAR 1	"	107	407	195	709	800	|	24	45
YEAR 2	"	136	413	181	730	800	|	24	45
YEAR 3	"	152	413	184	749	800	|	24	45
YEAR 4	"	165	413	184	762	800	|	24	45
YEAR 5	"	175	414	184	773	800	|	24	45
YEAR 6	"	183	414	184	781	800	|	24	45
YEAR 7	"	188	415	184	787	800	|	24	45
YEAR 8	"	193	415	185	793	800	|	24	45
YEAR 9	"	196	416	185	797	800	|	24	45
YEAR 10	"	199	417	185	800	800	|	24	45

		BULL RATIO	CALF RATIO
START		22	32
POST HUNT YR	1	23	54
POST HUNT YR	2	30	49
POST HUNT YR	3	35	50
POST HUNT YR	4	39	50
POST HUNT YR	5	41	50
POST HUNT YR	6	43	50
POST HUNT YR	7	45	50
POST HUNT YR	8	46	50
POST HUNT YR	9	47	50
POST HUNT YR	10	47	50

SAN LUIS RESERVOIR - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 22/100/32 - Maximum Calf Survival = 50%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL, ANTLERLESS, EITHER-SEX (INCLUDES COOPERATIVE TAGS)
TO HARVEST UP TO 7 BULL AND 15 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 70% bull and 50% antlerless

HERD SIZE	390	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	10	%
% OF BULLS KILLED BY HUNTERS	10.5	%
% OF COWS KILLED BY HUNTERS	5.6	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	56	253	81	390	390	5	0
YEAR 1	"	68	264	127	459	800	7	15
YEAR 2	"	93	282	125	500	800	7	15
YEAR 3	"	111	296	133	541	800	7	15
YEAR 4	"	128	313	141	582	800	7	15
YEAR 5	"	144	332	149	625	800	7	15
YEAR 6	"	158	353	159	670	800	7	15
YEAR 7	"	173	375	169	717	800	7	15
YEAR 8	"	188	401	180	768	800	7	15
YEAR 9	"	203	428	169	800	800	7	15
YEAR 10	"	210	448	142	800	800	7	15

		BULL RATIO	CALF RATIO
START		22	32
POST HUNT YR	1	25	51
POST HUNT YR	2	32	47
POST HUNT YR	3	37	47
POST HUNT YR	4	41	47
POST HUNT YR	5	43	47
POST HUNT YR	6	45	47
POST HUNT YR	7	46	47
POST HUNT YR	8	47	47
POST HUNT YR	9	47	41
POST HUNT YR	10	47	33

Bear Valley TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 25/100/51 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: BULL, COW,
TO HARVEST UP TO 3 BULLS & 2 COWS
Various combination of tags to achieved harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	225	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	8	%
% OF COWS KILLED BY HUNTERS	1.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	32	128	65	225	225	|	3	2
YEAR 1	"	43	127	84	254	350	|	3	2
YEAR 2	"	57	134	84	275	350	|	3	2
YEAR 3	"	67	139	88	294	350	|	3	2
YEAR 4	"	75	145	92	312	350	|	3	2
YEAR 5	"	82	151	96	329	350	|	3	2
YEAR 6	"	89	158	100	346	350	|	3	2
YEAR 7	"	95	165	91	350	350	|	3	2
YEAR 8	"	96	166	88	350	350	|	3	2
YEAR 9	"	95	167	88	350	350	|	3	2
YEAR 10	"	95	167	88	350	350	|	3	2

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	32	68
POST HUNT YR	2	41	64
POST HUNT YR	3	46	64
POST HUNT YR	4	50	64
POST HUNT YR	5	53	64
POST HUNT YR	6	55	64
POST HUNT YR	7	56	56
POST HUNT YR	8	56	53
POST HUNT YR	9	56	53
POST HUNT YR	10	55	53

Bear Valley TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 25/100/51 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED PROJECT: BULL, COW,
TO HARVEST UP TO 8 BULLS & 11 COWS, INCLUDES COOPERATIVE TAGS
Various combination of tags to achieved harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	225	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	18	%
% OF COWS KILLED BY HUNTERS	8.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	32	128	65	225	225	3	2
YEAR 1	"	43	127	84	254	350	8	11
YEAR 2	"	54	127	78	258	350	8	11
YEAR 3	"	60	124	78	261	350	8	11
YEAR 4	"	64	121	76	261	350	8	11
YEAR 5	"	66	119	74	258	350	8	11
YEAR 6	"	66	116	72	255	350	8	11
YEAR 7	"	66	113	70	250	350	8	11
YEAR 8	"	66	110	69	244	350	8	11
YEAR 9	"	65	107	67	238	350	8	11
YEAR 10	"	63	103	64	231	350	8	11

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	30	73
POST HUNT YR	2	40	67
POST HUNT YR	3	46	69
POST HUNT YR	4	50	68
POST HUNT YR	5	54	69
POST HUNT YR	6	56	69
POST HUNT YR	7	57	69
POST HUNT YR	8	58	69
POST HUNT YR	9	59	69
POST HUNT YR	10	60	69

Bear Valley TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 25/100/51 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL, COW,
TO HARVEST UP TO 12 BULLS & 16 COWS. INCLUDES COOPERATIVE TAGS
Various combination of tags to achieved harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	225	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	27	%
% OF COWS KILLED BY HUNTERS	13	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	32	128	65	225	225	|	3	2
YEAR 1	"	43	127	84	254	350	|	12	16
YEAR 2	"	52	122	74	247	350	|	12	16
YEAR 3	"	54	114	71	238	350	|	12	16
YEAR 4	"	54	106	65	226	350	|	12	16
YEAR 5	"	53	98	60	211	350	|	12	16
YEAR 6	"	50	89	55	194	350	|	12	16
YEAR 7	"	46	80	49	175	350	|	12	16
YEAR 8	"	41	70	43	154	350	|	12	16
YEAR 9	"	35	60	36	132	350	|	12	16
YEAR 10	"	29	49	29	108	350	|	12	16

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	29	76
POST HUNT YR	2	38	70
POST HUNT YR	3	43	73
POST HUNT YR	4	47	73
POST HUNT YR	5	50	74
POST HUNT YR	6	52	75
POST HUNT YR	7	54	77
POST HUNT YR	8	54	79
POST HUNT YR	9	55	83
POST HUNT YR	10	54	89

Bear Valley TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 25/100/51 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL, COW,
TO HARVEST UP TO 9 BULLS & 14 COWS. INCLUDES COOPERATIVE TAGS
Various combination of tags to achieved harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	15	%
% OF COWS KILLED BY HUNTERS	8.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	43	170	87	300	300	|	3	2
YEAR 1	"	58	170	113	341	350	|	9	14
YEAR 2	"	74	169	104	347	350	|	9	14
YEAR 3	"	82	165	102	350	350	|	9	14
YEAR 4	"	87	162	101	350	350	|	9	14
YEAR 5	"	90	158	99	347	350	|	9	14
YEAR 6	"	92	155	96	343	350	|	9	14
YEAR 7	"	92	151	94	336	350	|	9	14
YEAR 8	"	91	147	91	329	350	|	9	14
YEAR 9	"	90	142	89	320	350	|	9	14
YEAR 10	"	88	138	86	311	350	|	9	14

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	32	73
POST HUNT YR	2	42	67
POST HUNT YR	3	49	68
POST HUNT YR	4	53	69
POST HUNT YR	5	57	69
POST HUNT YR	6	59	69
POST HUNT YR	7	61	69
POST HUNT YR	8	62	69
POST HUNT YR	9	63	69
POST HUNT YR	10	64	69

Bear Valley TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 25/100/51 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL, COW,
TO HARVEST UP TO 4 BULLS & 5 COWS, INCLUDES COOPERATIVE TAGS
Various combination of tags to achieved harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	225	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	20	%
% OF BULLS KILLED BY HUNTERS	9	%
% OF COWS KILLED BY HUNTERS	4	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	32	128	65	225	225	|	3	2
YEAR 1	"	43	127	84	254	350	|	4	5
YEAR 2	"	57	131	82	270	350	|	4	5
YEAR 3	"	66	133	84	284	350	|	4	5
YEAR 4	"	73	136	86	295	350	|	4	5
YEAR 5	"	78	139	88	306	350	|	4	5
YEAR 6	"	83	143	90	316	350	|	4	5
YEAR 7	"	87	146	92	325	350	|	4	5
YEAR 8	"	90	150	95	335	350	|	4	5
YEAR 9	"	94	154	97	344	350	|	4	5
YEAR 10	"	97	158	96	350	350	|	4	5

		BULL RATIO	CALF RATIO
START		25	51
POST HUNT YR	1	32	69
POST HUNT YR	2	42	65
POST HUNT YR	3	48	66
POST HUNT YR	4	52	65
POST HUNT YR	5	55	65
POST HUNT YR	6	57	65
POST HUNT YR	7	59	65
POST HUNT YR	8	60	65
POST HUNT YR	9	60	65
POST HUNT YR	10	61	63

LAKE PILLSBURY TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 35/100/51 - Maximum Calf Survival = 53%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: HARVEST UP TO 2 BULL TAG 4 ANTLERLESS
NO CHANGE: HARVEST UP TO 2 BULL AND 4 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	150	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	4.1	%
% OF COWS KILLED BY HUNTERS	4.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	28	81	41	150	150	|	2	4
YEAR 1	"	37	83	41	161	200	|	2	4
YEAR 2	"	45	84	42	171	200	|	2	4
YEAR 3	"	51	86	43	180	200	|	2	4
YEAR 4	"	57	88	44	189	200	|	2	4
YEAR 5	"	62	90	45	197	200	|	2	4
YEAR 6	"	66	92	42	200	200	|	2	4
YEAR 7	"	68	93	39	200	200	|	2	4
YEAR 8	"	69	92	39	200	200	|	2	4
YEAR 9	"	70	91	39	200	200	|	2	4
YEAR 10	"	70	91	39	200	200	|	2	4

		BULL RATIO	CALF RATIO
START		35	51
POST HUNT YR	1	45	51
POST HUNT YR	2	54	52
POST HUNT YR	3	61	52
POST HUNT YR	4	66	52
POST HUNT YR	5	70	52
POST HUNT YR	6	73	48
POST HUNT YR	7	76	44
POST HUNT YR	8	77	45
POST HUNT YR	9	78	45
POST HUNT YR	10	79	45

LAKE PILLSBURY TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 35/100/51 - Maximum Calf Survival = 53%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED PROJECT: BULL & ANTLERLESS
TO HARVEST UP TO 6 BULL AND 7 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	150	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	15	%
% OF COWS KILLED BY HUNTERS	9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	28	81	41	150	150	|	2	4
YEAR 1	"	37	83	41	161	200	|	6	7
YEAR 2	"	42	81	40	163	200	|	6	7
YEAR 3	"	45	80	39	164	200	|	6	7
YEAR 4	"	47	78	38	164	200	|	6	7
YEAR 5	"	49	77	38	163	200	|	6	7
YEAR 6	"	49	76	37	162	200	|	6	7
YEAR 7	"	50	74	36	161	200	|	6	7
YEAR 8	"	50	73	36	159	200	|	6	7
YEAR 9	"	50	72	35	157	200	|	6	6
YEAR 10	"	49	70	35	154	200	|	6	6

		BULL RATIO	CALF RATIO
START		35	51
POST HUNT YR	1	42	54
POST HUNT YR	2	49	54
POST HUNT YR	3	54	54
POST HUNT YR	4	58	54
POST HUNT YR	5	61	54
POST HUNT YR	6	64	54
POST HUNT YR	7	66	54
POST HUNT YR	8	67	54
POST HUNT YR	9	68	54
POST HUNT YR	10	68	54

LAKE PILLSBURY TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 35/100/51 - Maximum Calf Survival = 53%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL & ANTLERLESS
TO HARVEST UP TO 9 BULL AND 10 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	150	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	23	%
% OF COWS KILLED BY HUNTERS	12.2	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	28	81	41	150	150	|	2	4
YEAR 1	"	37	86	41	164	200	|	9	10
YEAR 2	"	39	84	40	163	200	|	9	10
YEAR 3	"	40	82	39	162	200	|	9	10
YEAR 4	"	40	81	38	160	200	|	9	10
YEAR 5	"	40	79	38	157	200	|	9	10
YEAR 6	"	40	78	37	155	200	|	9	9
YEAR 7	"	39	76	36	152	200	|	9	9
YEAR 8	"	39	75	36	149	200	|	9	9
YEAR 9	"	38	74	35	147	200	|	9	9
YEAR 10	"	37	72	34	144	200	|	9	9

		BULL RATIO	CALF RATIO
START		35	51
POST HUNT YR	1	38	54
POST HUNT YR	2	41	54
POST HUNT YR	3	43	54
POST HUNT YR	4	44	54
POST HUNT YR	5	44	54
POST HUNT YR	6	45	54
POST HUNT YR	7	45	54
POST HUNT YR	8	45	54
POST HUNT YR	9	45	54
POST HUNT YR	10	45	54

LAKE PILLSBURY TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 35/100/51 - Maximum Calf Survival = 53%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL & ANTLERLESS
TO HARVEST UP TO 8 BULL AND 10 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	200	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	15	%
% OF COWS KILLED BY HUNTERS	9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	38	108	55	200	200	2	4
YEAR 1	"	50	111	38	200	200	8	10
YEAR 2	"	50	102	48	200	200	8	9
YEAR 3	"	53	100	48	200	200	8	9
YEAR 4	"	55	97	48	200	200	8	9
YEAR 5	"	57	95	47	199	200	8	9
YEAR 6	"	58	94	46	198	200	8	8
YEAR 7	"	59	92	45	196	200	8	8
YEAR 8	"	59	90	44	194	200	8	8
YEAR 9	"	59	89	44	192	200	8	8
YEAR 10	"	59	87	43	189	200	8	8

		BULL RATIO	CALF RATIO
START		35	51
POST HUNT YR	1	42	38
POST HUNT YR	2	45	52
POST HUNT YR	3	50	52
POST HUNT YR	4	54	54
POST HUNT YR	5	57	54
POST HUNT YR	6	60	54
POST HUNT YR	7	62	54
POST HUNT YR	8	63	54
POST HUNT YR	9	64	54
POST HUNT YR	10	64	54

LAKE PILLSBURY TULE ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 35/100/51 - Maximum Calf Survival = 53%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL & ANTLERLESS
TO HARVEST UP TO 3 BULL AND 3 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 90% bull and 90% antlerless

HERD SIZE	150	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	7.5	%
% OF COWS KILLED BY HUNTERS	3.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	28	81	41	150	150	2	4
YEAR 1	"	37	83	41	161	200	3	3
YEAR 2	"	44	85	42	171	200	3	3
YEAR 3	"	50	88	43	181	200	3	3
YEAR 4	"	55	90	45	190	200	3	3
YEAR 5	"	60	93	46	199	200	3	3
YEAR 6	"	64	96	40	200	200	3	3
YEAR 7	"	65	96	39	200	200	3	3
YEAR 8	"	65	95	39	200	200	3	3
YEAR 9	"	66	95	39	200	200	3	3
YEAR 10	"	66	95	39	200	200	3	3

		BULL RATIO	CALF RATIO
START		35	51
POST HUNT YR	1	43	51
POST HUNT YR	2	50	51
POST HUNT YR	3	56	51
POST HUNT YR	4	60	51
POST HUNT YR	5	63	51
POST HUNT YR	6	66	43
POST HUNT YR	7	67	43
POST HUNT YR	8	68	43
POST HUNT YR	9	69	43
POST HUNT YR	10	69	43

Santa Clara (PLM, SHARE, & GENERAL) - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 65%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: UP TO 10 BULL AND 8 ANTLERLESS
NO CHANGE: HARVEST UP TO 10 BULL AND 8 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	160	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	25	%
% OF COWS KILLED BY HUNTERS	8.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	37	85	38	160	160	|	0	0
YEAR 1	"	39	89	55	183	200	|	10	8
YEAR 2	"	40	92	53	185	200	|	10	8
YEAR 3	"	39	94	55	189	200	|	10	8
YEAR 4	"	40	97	56	193	200	|	10	8
YEAR 5	"	41	99	58	197	200	|	10	8
YEAR 6	"	42	101	57	200	200	|	10	8
YEAR 7	"	42	103	55	200	200	|	10	8
YEAR 8	"	42	104	55	200	200	|	10	8
YEAR 9	"	41	104	54	200	200	|	10	8
YEAR 10	"	41	105	54	200	200	|	10	8

		BULL RATIO	CALF RATIO
START		43	45
POST HUNT YR	1	36	68
POST HUNT YR	2	35	62
POST HUNT YR	3	34	64
POST HUNT YR	4	34	63
POST HUNT YR	5	34	63
POST HUNT YR	6	34	61
POST HUNT YR	7	34	58
POST HUNT YR	8	33	57
POST HUNT YR	9	33	57
POST HUNT YR	10	32	57

Santa Clara (PLM, SHARE & GENERAL) - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 65%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL AND ANTLERLESS (INCLUDES COOPERATIVE)
HARVEST UP TO: 10 BULL AND 10 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	160	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	25	%
% OF COWS KILLED BY HUNTERS	11	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	37	85	38	160	160	|	0	0
YEAR 1	"	39	89	55	183	200	|	10	10
YEAR 2	"	40	91	51	182	200	|	10	10
YEAR 3	"	39	90	52	182	200	|	10	10
YEAR 4	"	39	91	52	182	200	|	10	10
YEAR 5	"	39	91	52	182	200	|	10	10
YEAR 6	"	39	91	52	182	200	|	10	10
YEAR 7	"	39	91	53	182	200	|	10	10
YEAR 8	"	39	91	53	183	200	|	10	10
YEAR 9	"	39	91	53	183	200	|	10	10
YEAR 10	"	39	92	53	183	200	|	10	10

		BULL RATIO	CALF RATIO
START		43	45
POST HUNT YR	1	37	70
POST HUNT YR	2	37	64
POST HUNT YR	3	36	65
POST HUNT YR	4	36	65
POST HUNT YR	5	36	65
POST HUNT YR	6	36	65
POST HUNT YR	7	36	65
POST HUNT YR	8	36	65
POST HUNT YR	9	36	65
POST HUNT YR	10	36	65

Santa Clara PLM, SHARE, & GENERAL) - SIMULATION RUNS,
2016

Ratio = 43/100/40 - Maximum Calf Survival = 65%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL AND ANTLERLESS (INCLUDES COOPERATIVE)
HARVEST UP TO: 15 BULL AND 15 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	160	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	13	%
% OF BULLS KILLED BY HUNTERS	38	%
% OF COWS KILLED BY HUNTERS	16	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	37	85	38	160	160	0	0
YEAR 1	"	39	91	55	185	200	15	15
YEAR 2	"	36	90	50	176	200	14	14
YEAR 3	"	33	88	49	170	200	13	14
YEAR 4	"	32	85	48	165	200	12	14
YEAR 5	"	30	83	47	160	200	12	13
YEAR 6	"	30	81	45	156	200	11	13
YEAR 7	"	29	79	44	152	200	11	13
YEAR 8	"	28	77	43	148	200	11	12
YEAR 9	"	27	75	42	144	200	10	12
YEAR 10	"	27	73	41	141	200	10	12

		BULL RATIO	CALF RATIO
START		43	45
POST HUNT YR	1	32	73
POST HUNT YR	2	30	65
POST HUNT YR	3	28	67
POST HUNT YR	4	27	67
POST HUNT YR	5	27	67
POST HUNT YR	6	27	67
POST HUNT YR	7	27	67
POST HUNT YR	8	27	67
POST HUNT YR	9	27	67
POST HUNT YR	10	27	67

Santa Clara (PLM, SHARE & GENERAL) - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 65%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL AND ANTLERLESS (INCLUDES COOPERATIVE)
HARVEST UP TO: 11 BULL AND 13 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	200	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	23	%
% OF COWS KILLED BY HUNTERS	12	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	46	106	48	200	200	|	0	0
YEAR 1	"	49	111	65	225	225	|	11	13
YEAR 2	"	49	111	63	223	225	|	11	13
YEAR 3	"	49	110	63	222	225	|	11	13
YEAR 4	"	48	109	63	220	225	|	11	13
YEAR 5	"	48	108	62	219	225	|	11	13
YEAR 6	"	48	107	62	217	225	|	11	13
YEAR 7	"	47	107	61	215	225	|	11	13
YEAR 8	"	47	106	61	214	225	|	11	13
YEAR 9	"	47	105	61	212	225	|	11	13
YEAR 10	"	46	104	60	211	225	|	11	13

		BULL RATIO	CALF RATIO
START		43	45
POST HUNT YR	1	39	67
POST HUNT YR	2	39	65
POST HUNT YR	3	39	66
POST HUNT YR	4	39	65
POST HUNT YR	5	39	65
POST HUNT YR	6	39	65
POST HUNT YR	7	39	65
POST HUNT YR	8	39	65
POST HUNT YR	9	39	65
POST HUNT YR	10	39	65

Santa Clara (PLM, SHARE, & GENERAL) - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 65%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL AND ANTLERLESS (INCLUDES COOPERATIVE)
HARVEST UP TO: 5 BULL AND 5 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	160	ELK
% BULLS LOST TO NON HUNTING CAUSES	30	%
% COWS LOST TO NON HUNTING CAUSES	15	%
% OF BULLS KILLED BY HUNTERS	12	%
% OF COWS KILLED BY HUNTERS	5.1	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	37	85	38	160	160	|	0	0
YEAR 1	"	39	89	55	183	200	|	5	5
YEAR 2	"	43	95	55	193	200	|	5	5
YEAR 3	"	46	100	54	200	200	|	5	5
YEAR 4	"	47	104	49	200	200	|	5	5
YEAR 5	"	47	104	49	200	200	|	5	5
YEAR 6	"	46	105	49	200	200	|	5	5
YEAR 7	"	46	105	49	200	200	|	5	5
YEAR 8	"	45	106	49	200	200	|	5	5
YEAR 9	"	45	106	49	200	200	|	5	5
YEAR 10	"	45	106	49	200	200	|	5	5

		BULL RATIO	CALF RATIO
START		43	45
POST HUNT YR	1	41	66
POST HUNT YR	2	42	61
POST HUNT YR	3	43	57
POST HUNT YR	4	43	50
POST HUNT YR	5	42	49
POST HUNT YR	6	41	49
POST HUNT YR	7	40	49
POST HUNT YR	8	40	49
POST HUNT YR	9	39	48
POST HUNT YR	10	39	48

ALAMEDA TULE ELK HERD , GENERAL, SHARE, & PLM - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 55%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

CURRENT CONDITION: UP TO 3 BULL AND 2 ANTLERLESS
NO CHANGE: HARVEST UP TO 3 BULL AND 2 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	100	ELK
% BULLS LOST TO NON HUNTING CAUSES	32	%
% COWS LOST TO NON HUNTING CAUSES	16.6	%
% OF BULLS KILLED BY HUNTERS	11	%
% OF COWS KILLED BY HUNTERS	2.9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	23	55	22	100	100	|	0	0
YEAR 1	"	23	55	30	108	150	|	3	2
YEAR 2	"	24	57	29	110	150	|	3	2
YEAR 3	"	25	58	30	113	150	|	3	2
YEAR 4	"	25	60	31	116	150	|	3	2
YEAR 5	"	26	61	32	119	150	|	3	2
YEAR 6	"	27	63	33	122	150	|	3	2
YEAR 7	"	27	65	34	126	150	|	3	2
YEAR 8	"	28	66	35	129	150	|	3	2
YEAR 9	"	29	68	35	132	150	|	3	2
YEAR 10	"	29	70	36	136	150	|	3	2

		BULL RATIO	CALF RATIO
START		43	40
POST HUNT YR	1	39	57
POST HUNT YR	2	39	53
POST HUNT YR	3	39	54
POST HUNT YR	4	39	54
POST HUNT YR	5	39	54
POST HUNT YR	6	39	54
POST HUNT YR	7	39	54
POST HUNT YR	8	38	54
POST HUNT YR	9	38	54
POST HUNT YR	10	38	54

ALAMEDA TULE ELK HERD GENERAL, SHARE, & PLM - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 55%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

PROPOSED: BULL AND ANTLERLESS
HARVEST UP TO 3 BULL AND 2 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	100	ELK
% BULLS LOST TO NON HUNTING CAUSES	32	%
% COWS LOST TO NON HUNTING CAUSES	16.6	%
% OF BULLS KILLED BY HUNTERS	11	%
% OF COWS KILLED BY HUNTERS	2.9	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	23	55	22	100	100	|	0	0
YEAR 1	"	23	55	30	108	150	|	3	2
YEAR 2	"	24	57	29	110	150	|	3	2
YEAR 3	"	25	58	30	113	150	|	3	2
YEAR 4	"	25	60	31	116	150	|	3	2
YEAR 5	"	26	61	32	119	150	|	3	2
YEAR 6	"	27	63	33	122	150	|	3	2
YEAR 7	"	27	65	34	126	150	|	3	2
YEAR 8	"	28	66	35	129	150	|	3	2
YEAR 9	"	29	68	35	132	150	|	3	2
YEAR 10	"	29	70	36	136	150	|	3	2

		BULL RATIO	CALF RATIO
START		43	40
POST HUNT YR	1	39	57
POST HUNT YR	2	39	53
POST HUNT YR	3	39	54
POST HUNT YR	4	39	54
POST HUNT YR	5	39	54
POST HUNT YR	6	39	54
POST HUNT YR	7	39	54
POST HUNT YR	8	38	54
POST HUNT YR	9	38	54
POST HUNT YR	10	38	54

ALAMEDA TULE ELK HERD GENERAL, SHARE, & PLM - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 55%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

INCREASED HARVEST: BULL AND ANTLERLESS
HARVEST UP TO 6 BULL AND 4 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	100	ELK
% BULLS LOST TO NON HUNTING CAUSES	32	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	24	%
% OF COWS KILLED BY HUNTERS	6.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	23	55	22	100	100	0	0
YEAR 1	"	23	58	30	111	150	6	4
YEAR 2	"	22	61	30	113	150	5	4
YEAR 3	"	22	63	31	116	150	5	4
YEAR 4	"	22	66	32	120	150	5	4
YEAR 5	"	22	68	34	124	150	5	4
YEAR 6	"	23	71	35	129	150	6	4
YEAR 7	"	24	74	37	134	150	6	4
YEAR 8	"	25	77	38	140	150	6	4
YEAR 9	"	26	81	40	147	150	6	4
YEAR 10	"	27	85	38	150	150	6	4

		BULL RATIO	CALF RATIO
START		43	40
POST HUNT YR	1	33	56
POST HUNT YR	2	30	52
POST HUNT YR	3	28	53
POST HUNT YR	4	27	53
POST HUNT YR	5	27	53
POST HUNT YR	6	26	53
POST HUNT YR	7	26	53
POST HUNT YR	8	26	52
POST HUNT YR	9	26	52
POST HUNT YR	10	25	47

ALAMEDA TULE ELK HERD GENERAL, SHARE, & PLM - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 55%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

HERD GROWTH: BULL AND ANTLERLESS
HARVEST UP TO 4 BULL AND 6 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	150	ELK
% BULLS LOST TO NON HUNTING CAUSES	32	%
% COWS LOST TO NON HUNTING CAUSES	16.6	%
% OF BULLS KILLED BY HUNTERS	11	%
% OF COWS KILLED BY HUNTERS	7	%
	7	

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	35	82	33	150	150	|	0	0
YEAR 1	"	35	82	33	150	150	|	4	6
YEAR 2	"	32	77	40	150	150	|	4	5
YEAR 3	"	33	77	40	150	150	|	4	5
YEAR 4	"	34	76	39	149	150	|	4	5
YEAR 5	"	34	75	39	148	150	|	4	5
YEAR 6	"	34	75	39	147	150	|	4	5
YEAR 7	"	33	74	38	146	150	|	4	5
YEAR 8	"	33	73	38	144	150	|	4	5
YEAR 9	"	33	73	37	143	150	|	4	5
YEAR 10	"	33	72	37	142	150	|	4	5

		BULL RATIO	CALF RATIO
START		43	40
POST HUNT YR	1	41	43
POST HUNT YR	2	40	56
POST HUNT YR	3	42	55
POST HUNT YR	4	42	56
POST HUNT YR	5	43	56
POST HUNT YR	6	43	56
POST HUNT YR	7	43	56
POST HUNT YR	8	43	56
POST HUNT YR	9	43	56
POST HUNT YR	10	43	56

ALAMEDA TULE ELK HERD GENERAL, SHARE, & PLM - SIMULATION RUNS, 2016
Ratio = 43/100/40 - Maximum Calf Survival = 55%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS
HARVEST
RATES.

REDUCED HARVEST: BULL AND ANTLERLESS
HARVEST UP TO 2 BULL AND 1 ANTLERLESS
Various combination of tags to achieve harvest,
Assuming success rate of 80% bull and 60% antlerless

HERD SIZE	100	ELK
% BULLS LOST TO NON HUNTING CAUSES	32	%
% COWS LOST TO NON HUNTING CAUSES	16.6	%
% OF BULLS KILLED BY HUNTERS	6	%
% OF COWS KILLED BY HUNTERS	1.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	23	55	22	100	100	0	0
YEAR 1	"	23	55	30	108	150	1	1
YEAR 2	"	25	57	30	112	150	2	1
YEAR 3	"	26	60	31	117	150	2	1
YEAR 4	"	27	62	32	121	150	2	1
YEAR 5	"	28	64	34	126	150	2	1
YEAR 6	"	30	67	35	131	150	2	1
YEAR 7	"	31	69	36	136	150	2	1
YEAR 8	"	32	72	38	142	150	2	1
YEAR 9	"	33	75	39	147	150	2	1
YEAR 10	"	35	78	38	150	150	2	1

		BULL RATIO	CALF RATIO
START		43	40
POST HUNT YR	1	41	56
POST HUNT YR	2	42	52
POST HUNT YR	3	42	53
POST HUNT YR	4	42	53
POST HUNT YR	5	42	53
POST HUNT YR	6	42	53
POST HUNT YR	7	42	53
POST HUNT YR	8	42	53
POST HUNT YR	9	42	53
POST HUNT YR	10	42	49

SAN EMIGDIO ELK HERD - SIMULATION RUNS, 2016
Ratio = 52/100/20 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

CURRENT CONDITION: NO HUNTING

HERD SIZE	360	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	0	%
% OF COWS KILLED BY HUNTERS	0	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	109	209	42	360	360	0	0
YEAR 1	"	97	203	140	440	600	0	0
YEAR 2	"	126	240	136	501	600	0	0
YEAR 3	"	145	271	161	577	600	0	0
YEAR 4	"	169	309	122	600	600	0	0
YEAR 5	"	172	326	102	600	600	0	0
YEAR 6	"	168	331	101	600	600	0	0
YEAR 7	"	164	336	100	600	600	0	0
YEAR 8	"	160	340	100	600	600	0	0
YEAR 9	"	158	343	99	600	600	0	0
YEAR 10	"	155	346	99	600	600	0	0

		BULL RATIO	CALF RATIO
START		52	20
POST HUNT YR	1	48	69
POST HUNT YR	2	52	57
POST HUNT YR	3	54	59
POST HUNT YR	4	55	39
POST HUNT YR	5	53	31
POST HUNT YR	6	51	30
POST HUNT YR	7	49	30
POST HUNT YR	8	47	29
POST HUNT YR	9	46	29
POST HUNT YR	10	45	29

SAN EMIGDIO ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 52/100/20 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

PROPOSED PROJECT: BULL, COW, INCLUDING COOPERATIVE
TAGS
TO HARVEST UP TO 10 BULLS & 24 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	360	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	10	%
% OF COWS KILLED BY HUNTERS	12	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	109	209	42	360	360	|	0	0
YEAR 1	"	97	203	140	440	600	|	10	24
YEAR 2	"	118	219	119	456	600	|	10	24
YEAR 3	"	126	224	130	480	600	|	10	24
YEAR 4	"	136	233	133	502	600	|	10	24
YEAR 5	"	145	242	140	526	600	|	10	24
YEAR 6	"	154	253	146	553	600	|	10	24
YEAR 7	"	163	265	153	581	600	|	10	24
YEAR 8	"	172	280	148	600	600	|	10	24
YEAR 9	"	177	290	133	600	600	|	10	24
YEAR 10	"	176	292	132	600	600	|	10	24

		BULL RATIO	CALF RATIO
START		52	20
POST HUNT YR	1	49	79
POST HUNT YR	2	56	61
POST HUNT YR	3	58	65
POST HUNT YR	4	61	64
POST HUNT YR	5	62	64
POST HUNT YR	6	63	64
POST HUNT YR	7	63	64
POST HUNT YR	8	64	58
POST HUNT YR	9	63	50
POST HUNT YR	10	62	49

SAN EMIGDIO ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 52/100/20 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL, COW, EITHER SEX TAGS; INCLUDING COOPERATIVE TAGS
TO HARVEST UP TO 15 BULLS & 36 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	360	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	15	%
% OF COWS KILLED BY HUNTERS	17.7	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	109	209	42	360	360	|	0	0
YEAR 1	"	97	203	140	440	600	|	15	36
YEAR 2	"	115	208	112	435	600	|	15	36
YEAR 3	"	117	201	116	434	600	|	15	36
YEAR 4	"	120	196	111	427	600	|	15	36
YEAR 5	"	121	190	107	418	600	|	15	36
YEAR 6	"	120	183	103	406	600	|	15	36
YEAR 7	"	118	175	98	391	600	|	15	36
YEAR 8	"	114	165	93	373	600	|	15	36
YEAR 9	"	110	155	87	351	600	|	15	36
YEAR 10	"	104	143	80	326	600	|	15	36

		BULL RATIO	CALF RATIO
START		52	20
POST HUNT YR	1	50	84
POST HUNT YR	2	58	65
POST HUNT YR	3	62	70
POST HUNT YR	4	66	69
POST HUNT YR	5	69	70
POST HUNT YR	6	72	70
POST HUNT YR	7	74	71
POST HUNT YR	8	77	72
POST HUNT YR	9	80	73
POST HUNT YR	10	83	74

SAN EMIGDIO ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 52/100/20 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL, COW, EITHER SEX TAGS; INCLUDING COOPERATIVE TAGS
TO HARVEST UP TO 25 BULLS & 42 COWS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	600	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	15.5	%
% OF COWS KILLED BY HUNTERS	12.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	181	349	70	600	600	|	0	0
YEAR 1	"	162	338	100	600	600	|	25	42
YEAR 2	"	140	304	156	600	600	|	25	42
YEAR 3	"	145	299	156	600	600	|	25	42
YEAR 4	"	148	295	157	600	600	|	25	42
YEAR 5	"	151	291	157	600	600	|	25	42
YEAR 6	"	154	288	158	600	600	|	25	42
YEAR 7	"	156	286	158	600	600	|	25	42
YEAR 8	"	157	284	159	600	600	|	25	42
YEAR 9	"	158	283	159	600	600	|	25	42
YEAR 10	"	160	282	159	600	600	|	25	42

		BULL RATIO	CALF RATIO
START		52	20
POST HUNT YR	1	46	34
POST HUNT YR	2	44	59
POST HUNT YR	3	47	61
POST HUNT YR	4	49	62
POST HUNT YR	5	51	63
POST HUNT YR	6	52	64
POST HUNT YR	7	53	65
POST HUNT YR	8	55	65
POST HUNT YR	9	55	66
POST HUNT YR	10	56	66

SAN EMIGDIO ELK HERD - SIMULATION RUNS, GENERAL, SHARE, & PLM 2016
Ratio = 52/100/20 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

REDUCED HARVEST: BULL, COW, INCLUDING COOPERATIVE TAGS
TO HARVEST UP TO 5 BULLS & 12 ANTLERLESS
Various combination of tags to achieved harvest, includes cooperative tags
Assuming success rate of 80% bull and 75% antlerless

HERD SIZE	360	ELK
% BULLS LOST TO NON HUNTING CAUSES	25	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	5	%
% OF COWS KILLED BY HUNTERS	6	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	109	209	42	360	360	0	0
YEAR 1	"	97	203	140	440	600	5	12
YEAR 2	"	122	229	128	479	600	5	12
YEAR 3	"	136	247	145	528	600	5	12
YEAR 4	"	153	271	157	581	600	5	12
YEAR 5	"	170	297	133	600	600	5	12
YEAR 6	"	174	309	117	600	600	5	12
YEAR 7	"	171	313	117	600	600	5	12
YEAR 8	"	168	316	116	600	600	5	12
YEAR 9	"	166	318	116	600	600	5	12
YEAR 10	"	164	320	115	600	600	5	12

		BULL RATIO	CALF RATIO
START		52	20
POST HUNT YR	1	49	74
POST HUNT YR	2	54	59
POST HUNT YR	3	56	62
POST HUNT YR	4	57	61
POST HUNT YR	5	58	47
POST HUNT YR	6	57	39
POST HUNT YR	7	55	39
POST HUNT YR	8	54	38
POST HUNT YR	9	53	38
POST HUNT YR	10	52	37

CAMP ROBERTS ELK HERD - SIMULATION RUNS, GENERAL AND MILITARY 2016
Ratio = 30/100/30 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

CURRENT CONDITION:
NO HARVEST

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	0	%
% OF COWS KILLED BY HUNTERS	0	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	56	188	56	300	300	0	0
YEAR 1	"	68	190	126	383	1000	0	0
YEAR 2	"	104	222	127	454	1000	0	0
YEAR 3	"	134	252	149	535	1000	0	0
YEAR 4	"	167	287	169	622	1000	0	0
YEAR 5	"	201	327	192	720	1000	0	0
YEAR 6	"	238	372	219	828	1000	0	0
YEAR 7	"	278	424	249	950	1000	0	0
YEAR 8	"	322	482	196	1000	1000	0	0
YEAR 9	"	336	511	154	1000	1000	0	0
YEAR 10	"	330	517	153	1000	1000	0	0

		BULL RATIO	CALF RATIO
START		30	30
POST HUNT YR	1	36	66
POST HUNT YR	2	47	57
POST HUNT YR	3	53	59
POST HUNT YR	4	58	59
POST HUNT YR	5	62	59
POST HUNT YR	6	64	59
POST HUNT YR	7	66	59
POST HUNT YR	8	67	41
POST HUNT YR	9	66	30
POST HUNT YR	10	64	30

CAMP ROBERTS ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND MILITARY 2016
Ratio = 30/100/30 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

PROPOSED: BULL, COW, EITHER SEX TAGS; MILITARY AND
GENERAL
HARVEST UP TO 15 BULL & 30 ANTLERLESS
Various combination of tags to achieved harvest
Approximate success rate of 70% bull and 60% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	22	%
% OF COWS KILLED BY HUNTERS	16	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	56	188	56	300	300	0	0
YEAR 1	"	68	190	126	383	1000	15	30
YEAR 2	"	92	196	107	395	1000	15	30
YEAR 3	"	105	192	111	408	1000	15	30
YEAR 4	"	116	191	109	416	1000	15	30
YEAR 5	"	124	189	108	422	1000	15	30
YEAR 6	"	131	187	107	425	1000	15	30
YEAR 7	"	135	185	105	426	1000	15	30
YEAR 8	"	138	182	104	424	1000	15	30
YEAR 9	"	140	179	102	422	1000	15	30
YEAR 10	"	141	176	100	417	1000	15	30

		BULL RATIO	CALF RATIO
START		30	30
POST HUNT YR	1	33	79
POST HUNT YR	2	47	65
POST HUNT YR	3	55	68
POST HUNT YR	4	63	67
POST HUNT YR	5	69	68
POST HUNT YR	6	74	68
POST HUNT YR	7	78	68
POST HUNT YR	8	81	68
POST HUNT YR	9	84	68
POST HUNT YR	10	87	69

CAMP ROBERTS ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND MILITARY 2016
Ratio = 30/100/30 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

INCREASED HARVEST: BULL, COW, EITHER SEX TAGS; MILITARY AND GENERAL
HARVEST UP TO 22 BULL & 45 ANTLERLESS
Various combination of tags to achieved harvest,
Approximate success rate of 70% bull and 60% antlerless

HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	32	%
% OF COWS KILLED BY HUNTERS	23.5	%

		BULLS	COWS	SURV. CALVES	TOTAL	K	BULLS HARVEST	COWS HARVEST
START	AUG	56	188	56	300	300	0	0
YEAR 1	"	68	190	126	383	1000	22	45
YEAR 2	"	87	183	97	367	1000	22	45
YEAR 3	"	91	165	93	349	1000	22	45
YEAR 4	"	93	146	80	320	1000	22	45
YEAR 5	"	89	125	68	282	1000	22	45
YEAR 6	"	81	101	54	236	1000	22	45
YEAR 7	"	69	73	38	180	1000	22	45
YEAR 8	"	53	42	19	114	1000	22	45
YEAR 9	"	33	6	-2	37	1000	22	45
YEAR 10	"	8	-35	-26	-53	1000	22	45

		BULL RATIO	CALF RATIO
START		30	30
POST HUNT YR	1	32	87
POST HUNT YR	2	47	70
POST HUNT YR	3	58	77
POST HUNT YR	4	70	79
POST HUNT YR	5	84	85
POST HUNT YR	6	106	96
POST HUNT YR	7	167	132
POST HUNT YR	8	-1087	-658
POST HUNT YR	9	-29	5
POST HUNT YR	10	17	33

CAMP ROBERTS ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND MILITARY 2016
Ratio = 30/100/30 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

HERD GROWTH: BULL, COW, EITHER SEX TAGS; MILITARY AND GENERAL
HARVEST UP TO 28 BULL & 47 ANTLERLESS
Various combination of tags to achieved harvest,
Approximate success rate of 70% bull and 60% antlerless

HERD SIZE	500	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	25	%
% OF COWS KILLED BY HUNTERS	15	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	94	313	94	500	500	|	0	0
YEAR 1	"	113	316	209	638	1000	|	28	47
YEAR 2	"	151	329	180	660	1000	|	28	47
YEAR 3	"	171	327	188	686	1000	|	28	47
YEAR 4	"	189	329	187	705	1000	|	28	47
YEAR 5	"	204	330	188	722	1000	|	28	47
YEAR 6	"	216	331	189	737	1000	|	28	47
YEAR 7	"	226	333	190	749	1000	|	28	47
YEAR 8	"	234	335	191	761	1000	|	28	47
YEAR 9	"	242	337	193	772	1000	|	28	47
YEAR 10	"	248	340	194	782	1000	|	28	47

		BULL RATIO	CALF RATIO
START		30	30
POST HUNT YR	1	31	78
POST HUNT YR	2	44	64
POST HUNT YR	3	51	67
POST HUNT YR	4	57	67
POST HUNT YR	5	62	67
POST HUNT YR	6	66	67
POST HUNT YR	7	69	67
POST HUNT YR	8	72	67
POST HUNT YR	9	74	66
POST HUNT YR	10	75	66

CAMP ROBERTS ELK HERD - SIMULATION RUNS, GENERAL, SHARE, AND MILITARY 2016
Ratio = 30/100/30 - Maximum Calf Survival = 67%
THIS PROGRAM CALCULATES CHANGES IN
HERD
CHARACTERISTICS BASED ON VARIOUS HARVEST RATES.

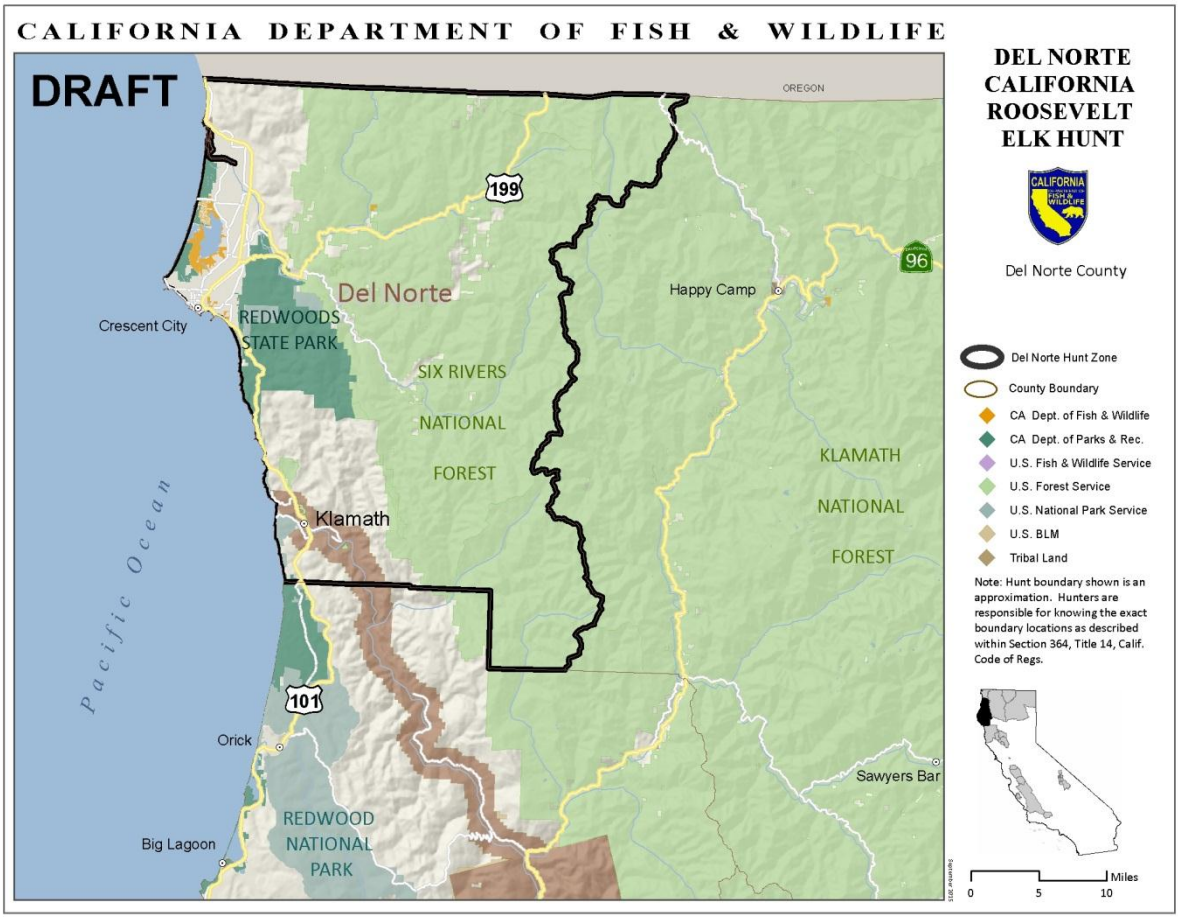
REDUCED HARVEST: BULL, COW, EITHER SEX TAGS; MILITARY AND GENERAL
HARVEST UP TO 7 BULL & 15 ANTLERLESS
Various combination of tags to achieved harvest
Approximate success rate of 70% bull and 60% antlerless

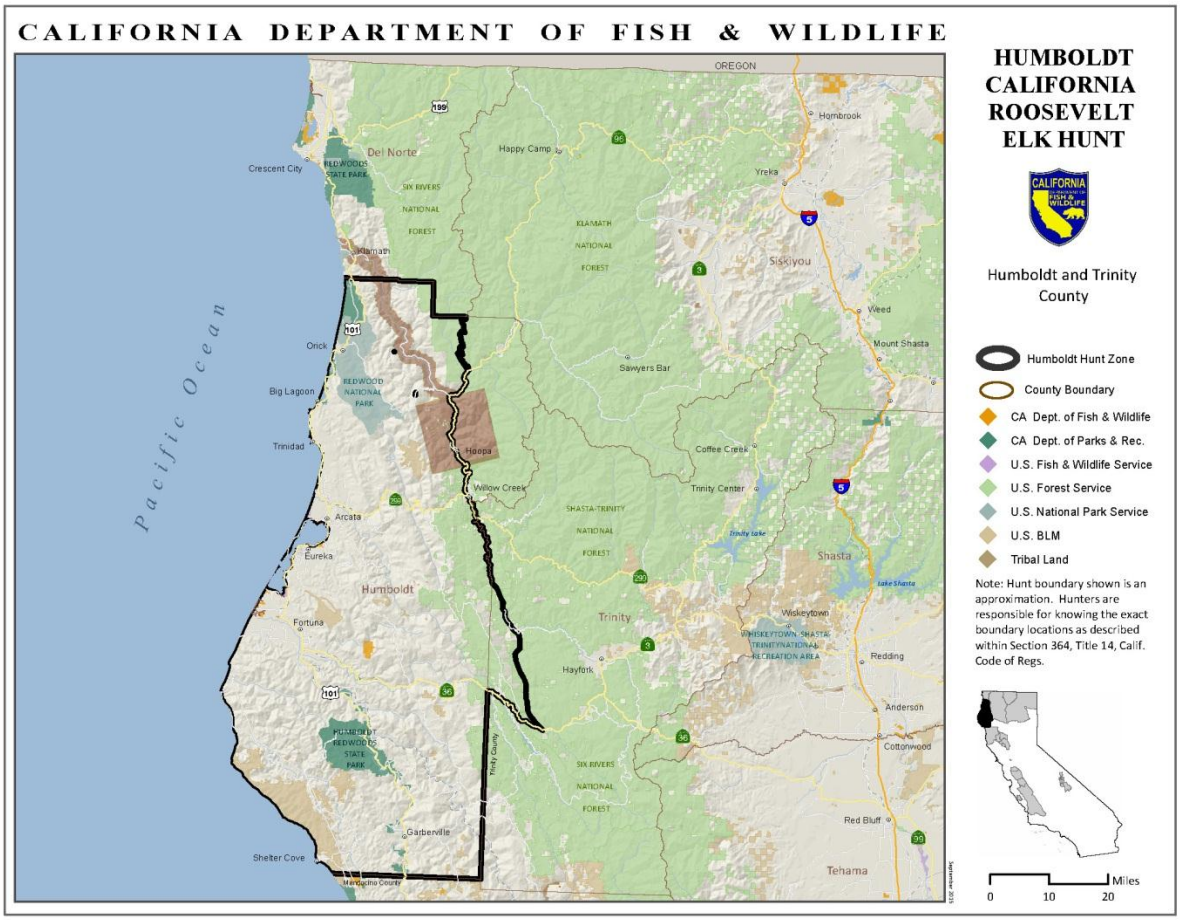
HERD SIZE	300	ELK
% BULLS LOST TO NON HUNTING CAUSES	20	%
% COWS LOST TO NON HUNTING CAUSES	12	%
% OF BULLS KILLED BY HUNTERS	11	%
% OF COWS KILLED BY HUNTERS	8	%

		BULLS	COWS	SURV. CALVES	TOTAL	K		BULLS HARVEST	COWS HARVEST
START	AUG	56	188	56	300	300	|	0	0
YEAR 1	"	68	190	126	383	1000	|	7	15
YEAR 2	"	98	209	117	424	1000	|	7	15
YEAR 3	"	119	222	130	471	1000	|	7	15
YEAR 4	"	142	239	139	519	1000	|	7	15
YEAR 5	"	163	258	150	571	1000	|	7	15
YEAR 6	"	184	280	163	627	1000	|	7	15
YEAR 7	"	207	304	177	688	1000	|	7	15
YEAR 8	"	230	332	194	756	1000	|	7	15
YEAR 9	"	256	364	213	833	1000	|	7	15
YEAR 10	"	284	401	234	918	1000	|	7	15

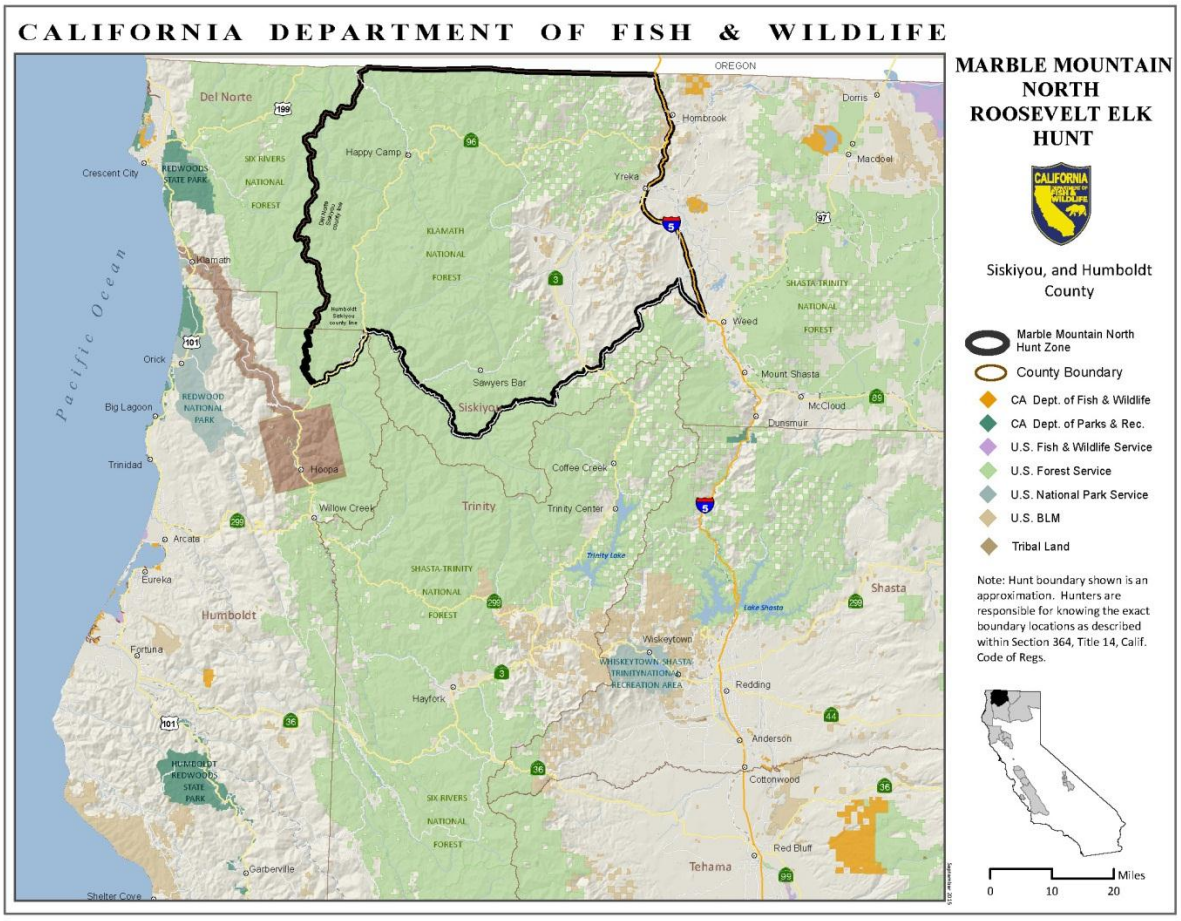
		BULL RATIO	CALF RATIO
START		30	30
POST HUNT YR	1	34	72
POST HUNT YR	2	47	60
POST HUNT YR	3	54	63
POST HUNT YR	4	60	62
POST HUNT YR	5	64	62
POST HUNT YR	6	67	62
POST HUNT YR	7	69	61
POST HUNT YR	8	70	61
POST HUNT YR	9	71	61
POST HUNT YR	10	72	61

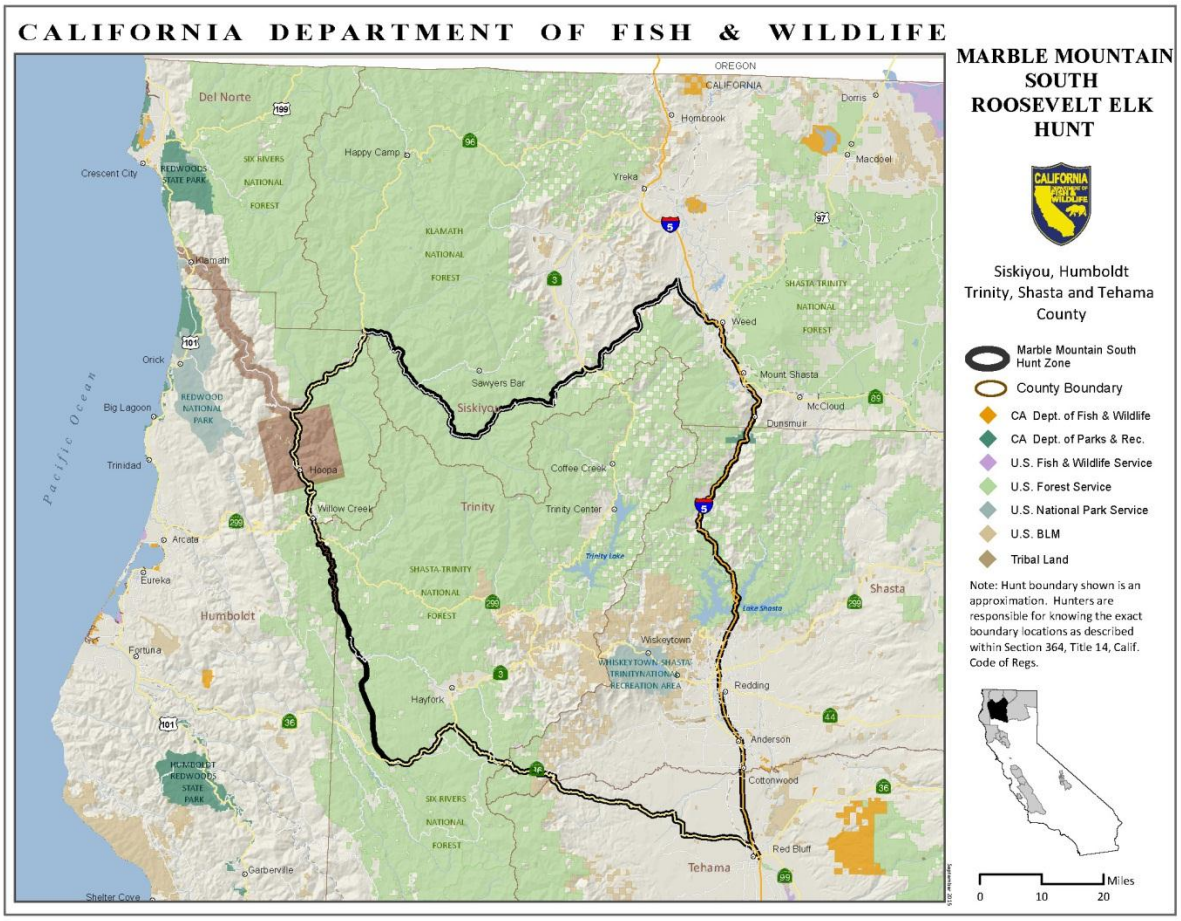
Appendix 5. Hunt Boundary Maps for Del Norte and Humboldt Roosevelt Elk Zones



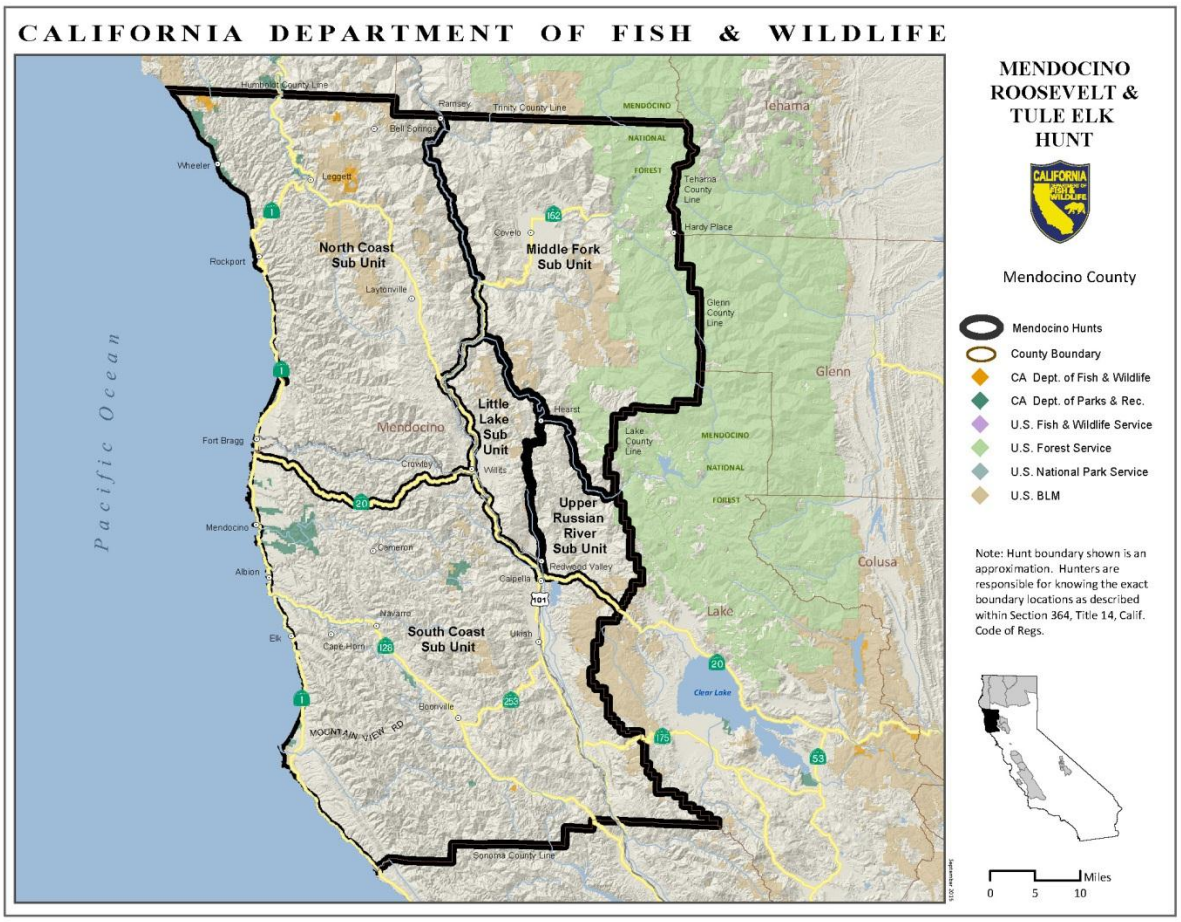

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE
OREGON
Pacific Ocean
Del Norte
Crescent City
Happy Camp
Hornbrook
Yreka
Siskiyou
Weed
Mount Shasta
Sawyers Bar
Orick
Big Lagoon
Trinidad
Hoopa
Willow Creek
Coffee Creek
Trinity Center
Arcata
Eureka
Humboldt
Fortuna
Trinity
Hayfork
Shasta
Wiskeytown
Redding
Anderson
Cottonwood
Red Bluff
Tehama
Garberville
Shelter Cove
Trinity County
Mendocino County
HUMBOLDT CALIFORNIA ROOSEVELT ELK HUNT
Humboldt and Trinity County
Humboldt Hunt Zone
County Boundary
CA Dept. of Fish & Wildlife
CA Dept. of Parks & Rec.
U.S. Fish & Wildlife Service
U.S. Forest Service
U.S. National Park Service
U.S. BLM
Tribal Land
Note: Hunt boundary shown is an approximation. Hunters are responsible for knowing the exact boundary locations as described within Section 364, Title 14, Calif. Code of Regs.
Miles
0
10
20

Appendix 6. New Hunt Boundary Maps for Marble Mountain North and South

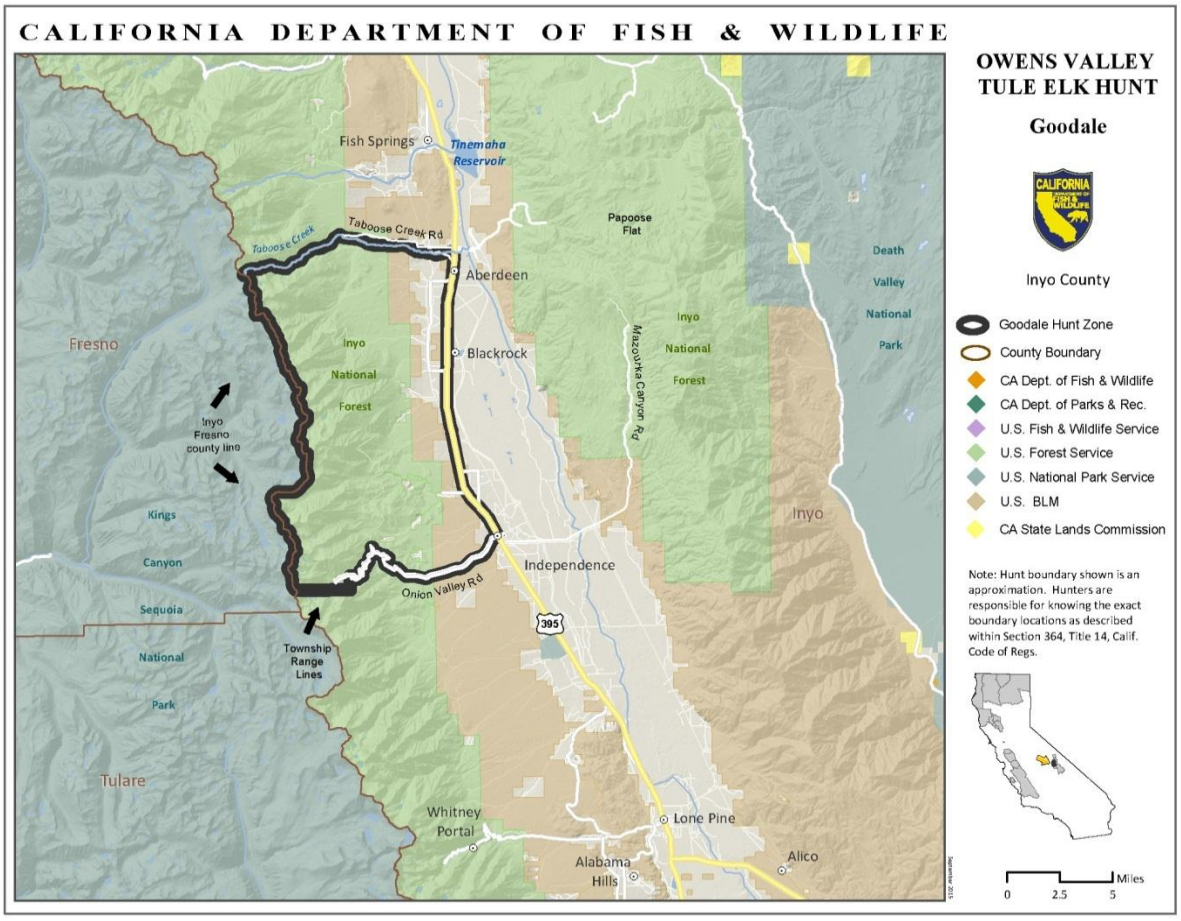


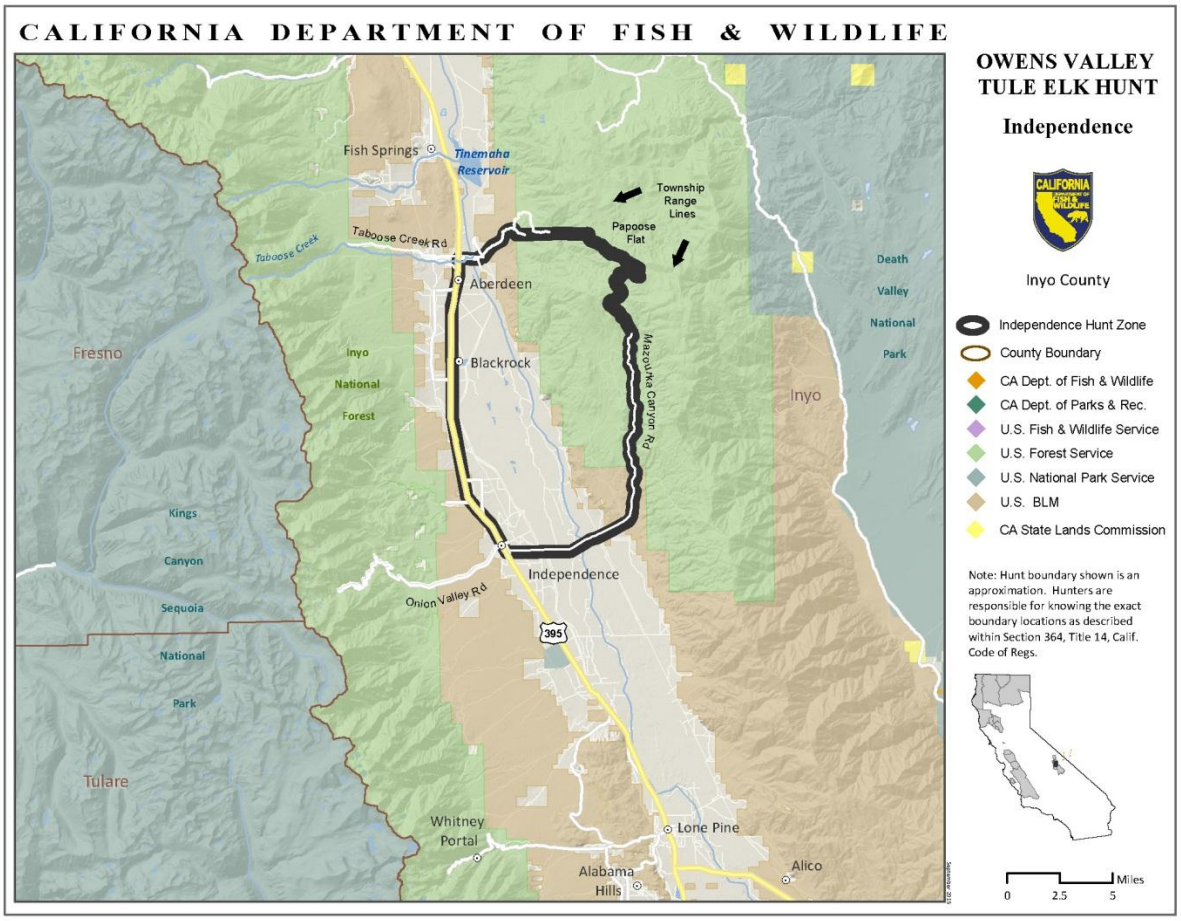

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE
MARBLE MOUNTAIN SOUTH ROOSEVELT ELK HUNT
Siskiyou, Humboldt Trinity, Shasta and Tehama County
Marble Mountain South Hunt Zone
County Boundary
CA Dept. of Fish & Wildlife
CA Dept. of Parks & Rec.
U.S. Fish & Wildlife Service
U.S. Forest Service
U.S. National Park Service
U.S. BLM
Tribal Land
Note: Hunt boundary shown is an approximation. Hunters are responsible for knowing the exact boundary locations as described within Section 364, Title 14, Calif. Code of Regs.
Miles
0
10
20
OREGON
CALIFORNIA
Del Norte
Humboldt
Siskiyou
Trinity
Shasta
Tehama
Pacific Ocean
Crescent City
Orick
Big Lagoon
Trinidad
Arcata
Eureka
Fortuna
Garberville
Shelter Cove
Hoopa
Willow Creek
Happy Camp
Yreka
Hombrook
Dorris
Macdoel
Klamath
Sawyers Bar
Weed
Mount Shasta
McCloud
Dunsmuir
Coffee Creek
Trinity Center
Trinity Lake
Lake Shasta
Wiskeytown
Redding
Anderson
Cottonwood
Red Bluff
Hayfork

Appendix 7. New Hunt Boundary Maps for Mendocino (Mendocino North Coast, Mendocino Middle Fork, Mendocino Upper Russian River, Mendocino Little Lake, and Mendocino South Coast elk hunts)

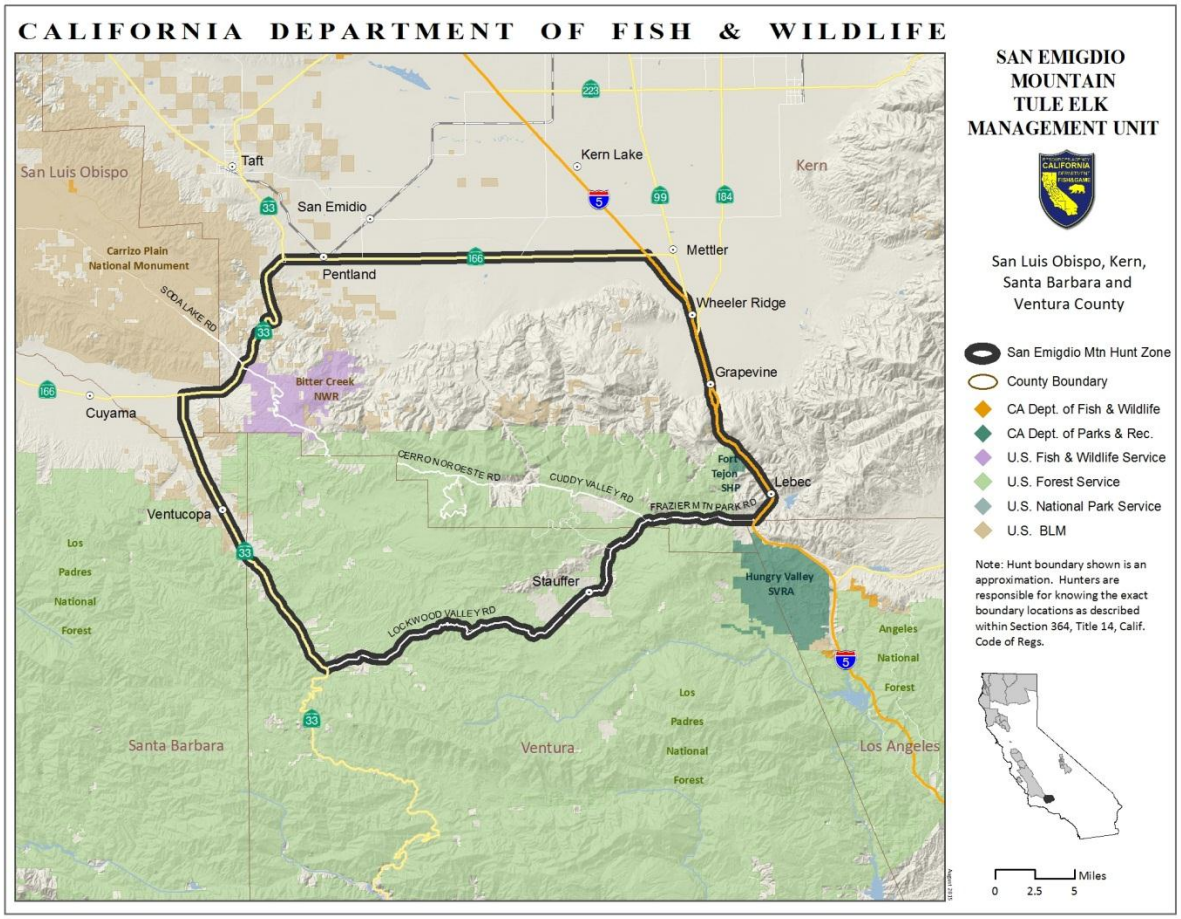


Appendix 8. New Hunt Boundary Maps for Independence and Goodale

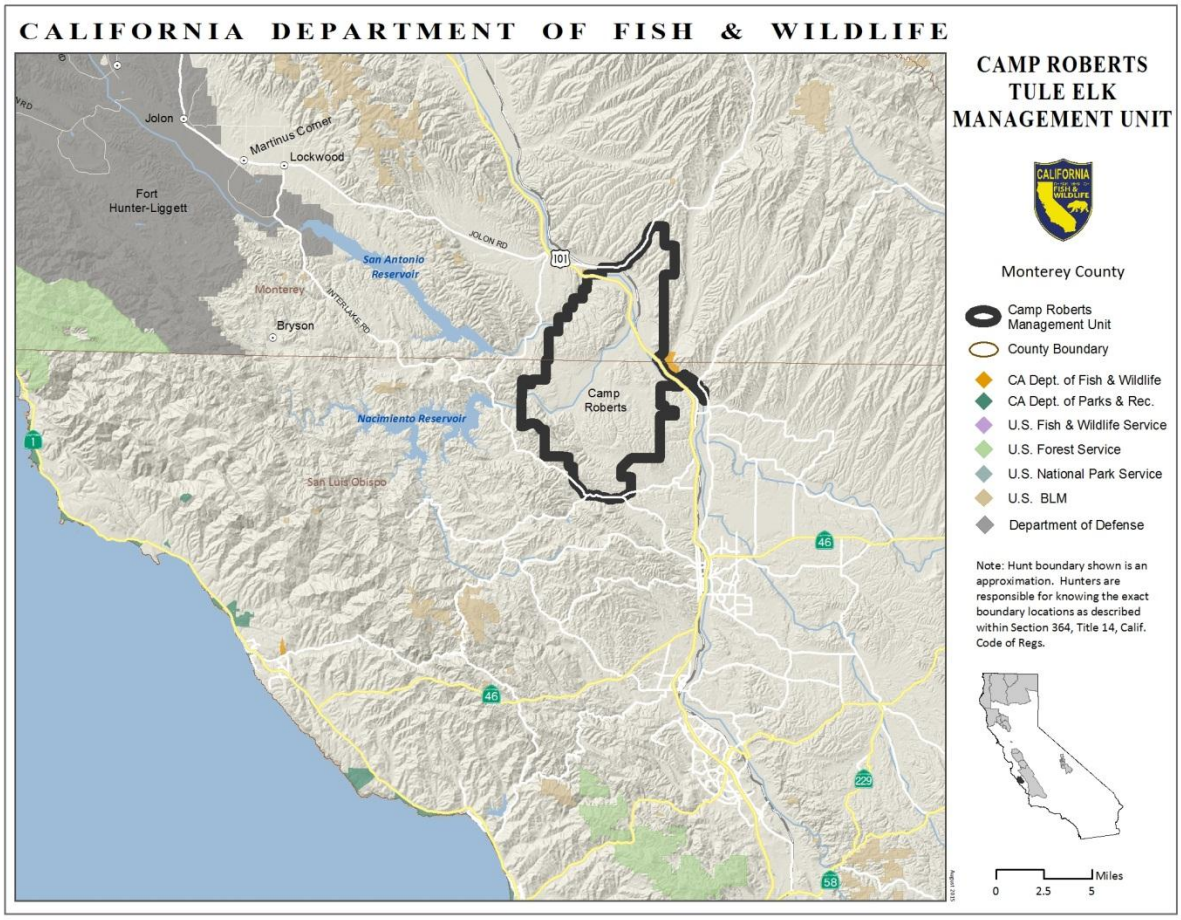



CALIFORNIA DEPARTMENT OF FISH & WILDLIFE
OWENS VALLEY
TULE ELK HUNT
Independence
Inyo County
Independence Hunt Zone
County Boundary
CA Dept. of Fish & Wildlife
CA Dept. of Parks & Rec.
U.S. Fish & Wildlife Service
U.S. Forest Service
U.S. National Park Service
U.S. BLM
CA State Lands Commission
Note: Hunt boundary shown is an approximation. Hunters are responsible for knowing the exact boundary locations as described within Section 364, Title 14, Calif. Code of Regs.
Miles
0
2.5
5
Fish Springs
Tinemaha Reservoir
Township Range Lines
Papoose Flat
Taboose Creek Rd
Taboose Creek
Aberdeen
Blackrock
Mazourka Canyon Rd
Death Valley National Park
Fresno
Inyo National Forest
Inyo
Kings Canyon Sequoia National Park
Tulare
Independence
Onion Valley Rd
395
Whitney Portal
Lone Pine
Alabama Hills
Alico

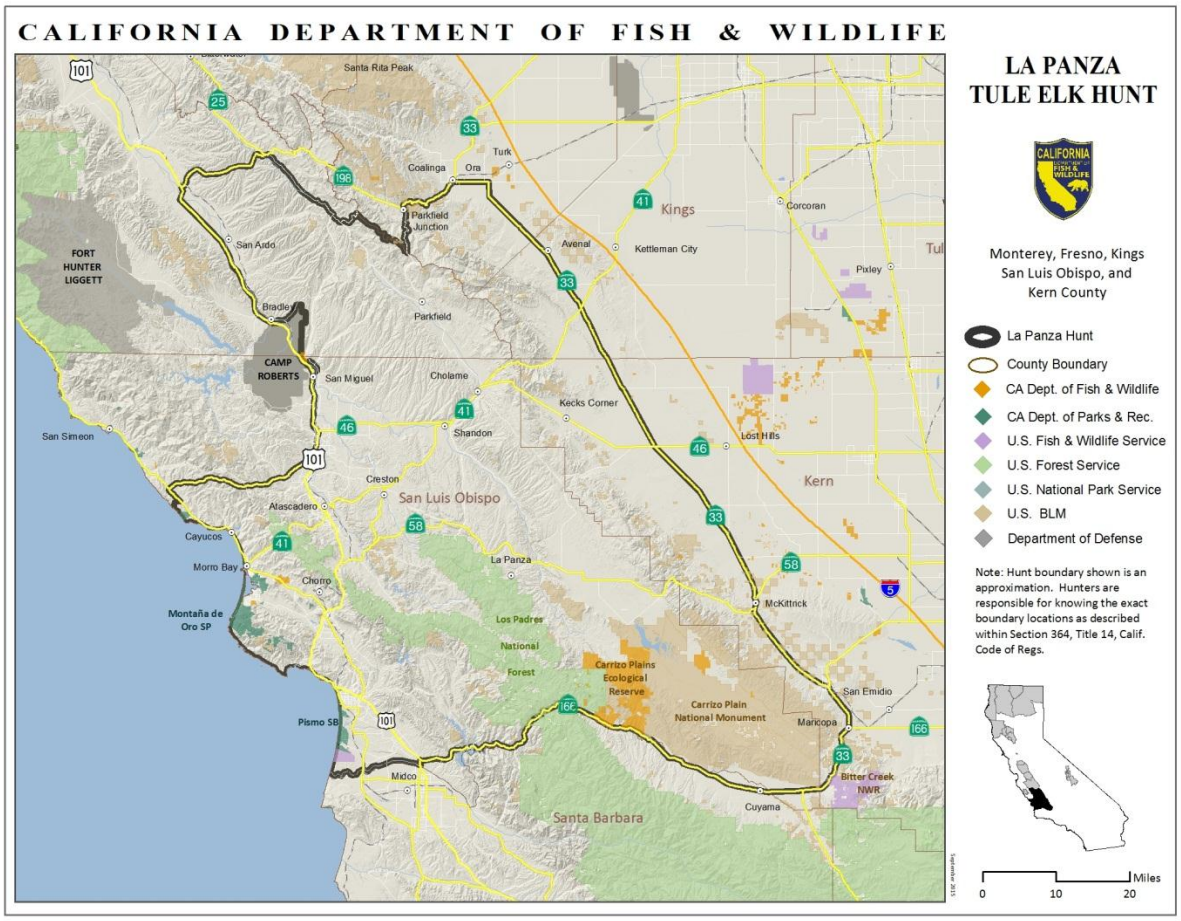
Appendix 9. Hunt Boundary Map for San Emigdio Mountain



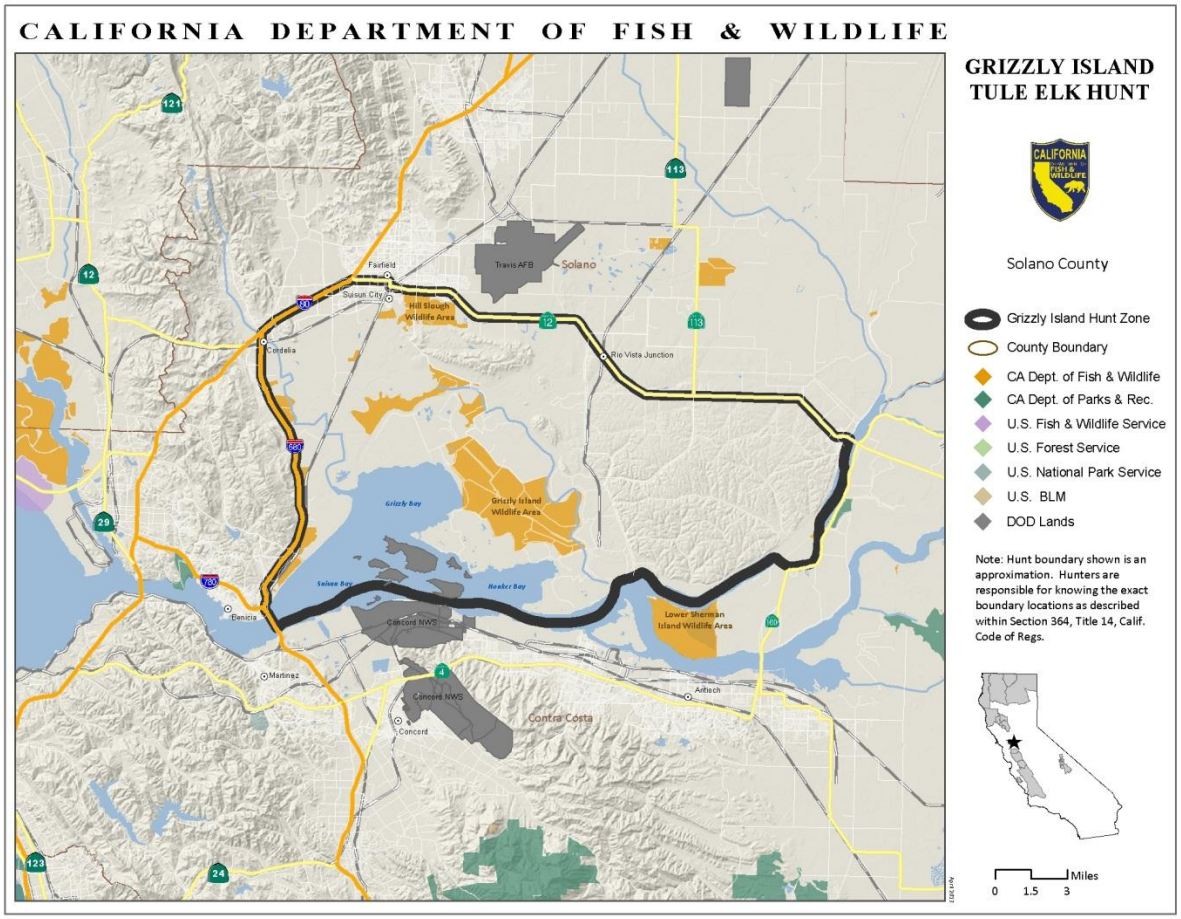
Appendix 10. Hunt Boundary Map for Camp Roberts



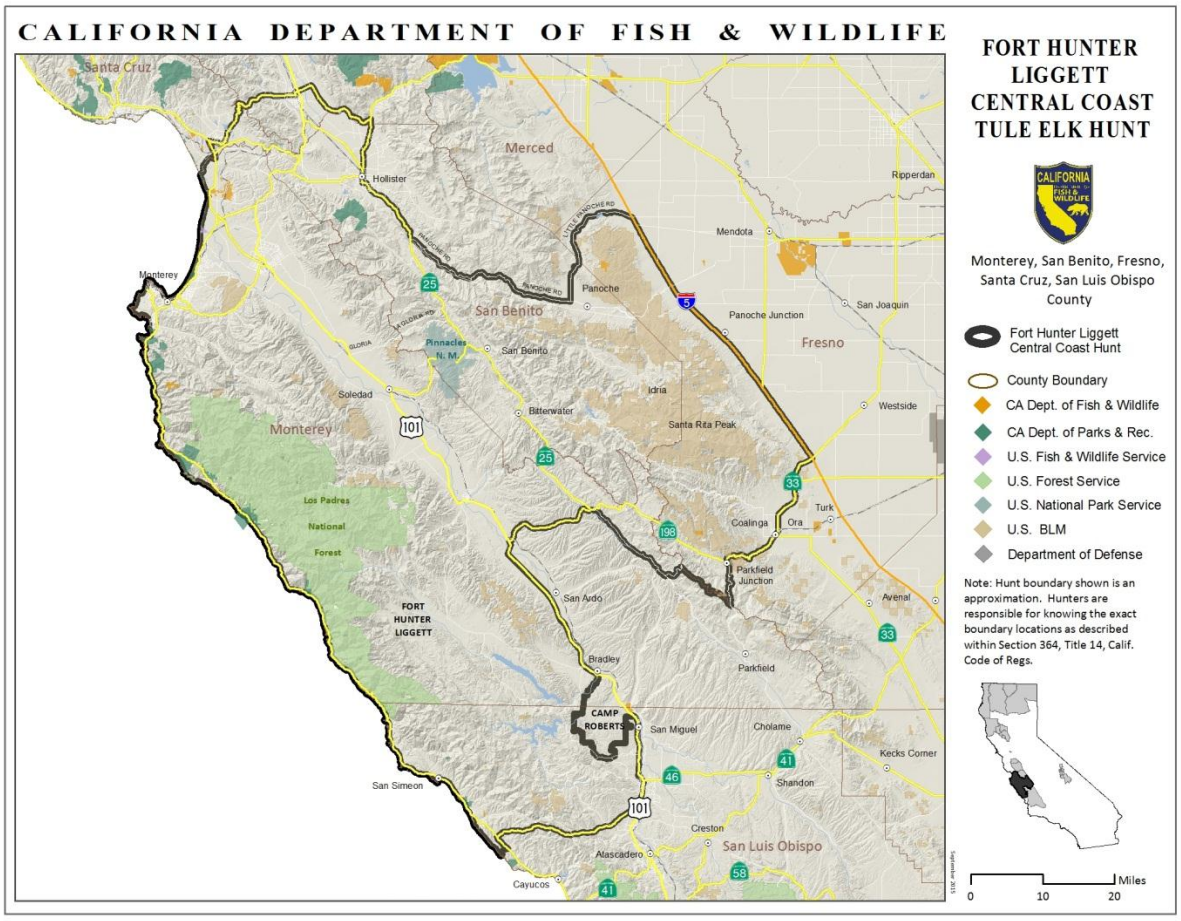
Appendix 11. New Hunt Boundary Map for La Panza



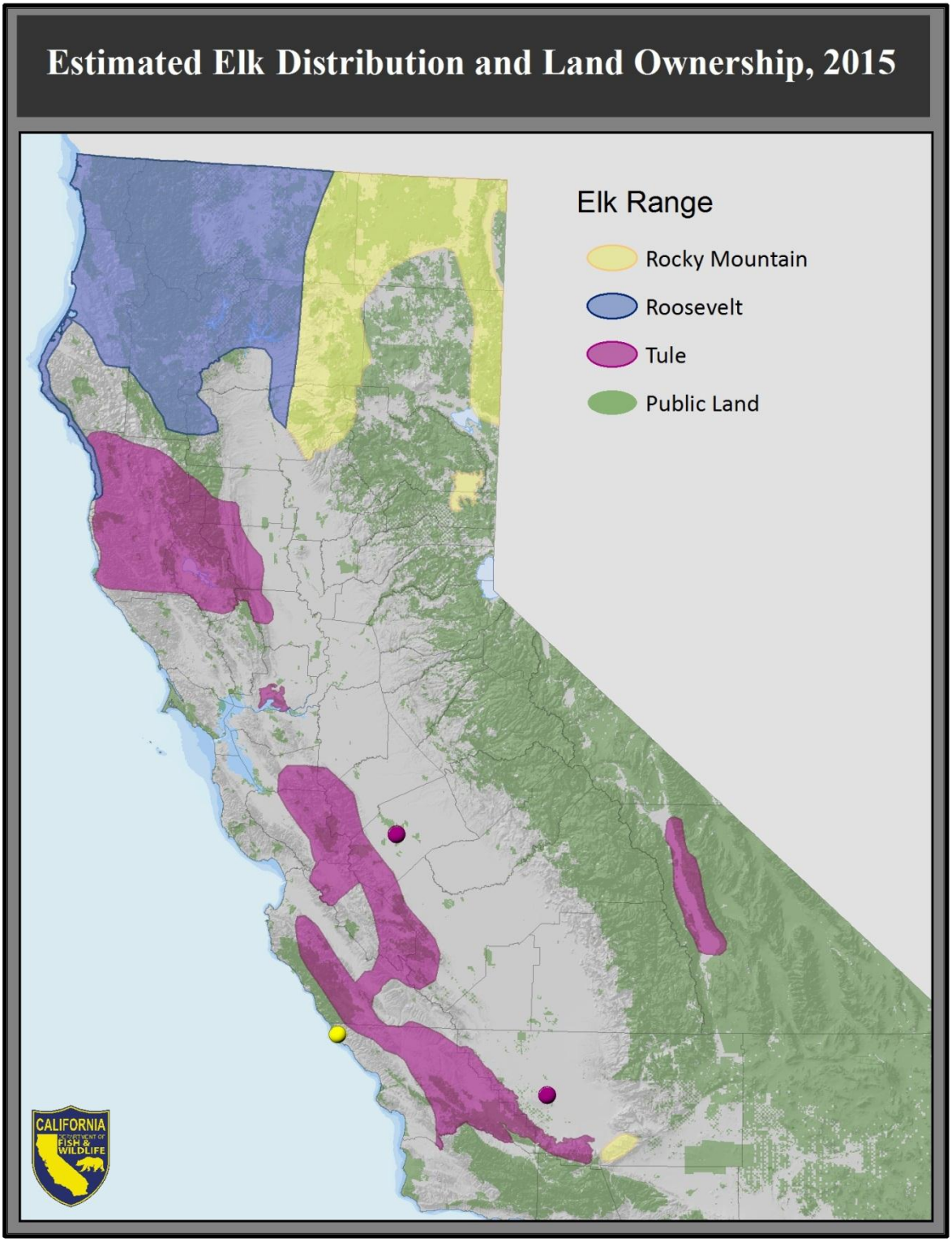
Appendix 12. New Hunt Boundary Map for Grizzly Island



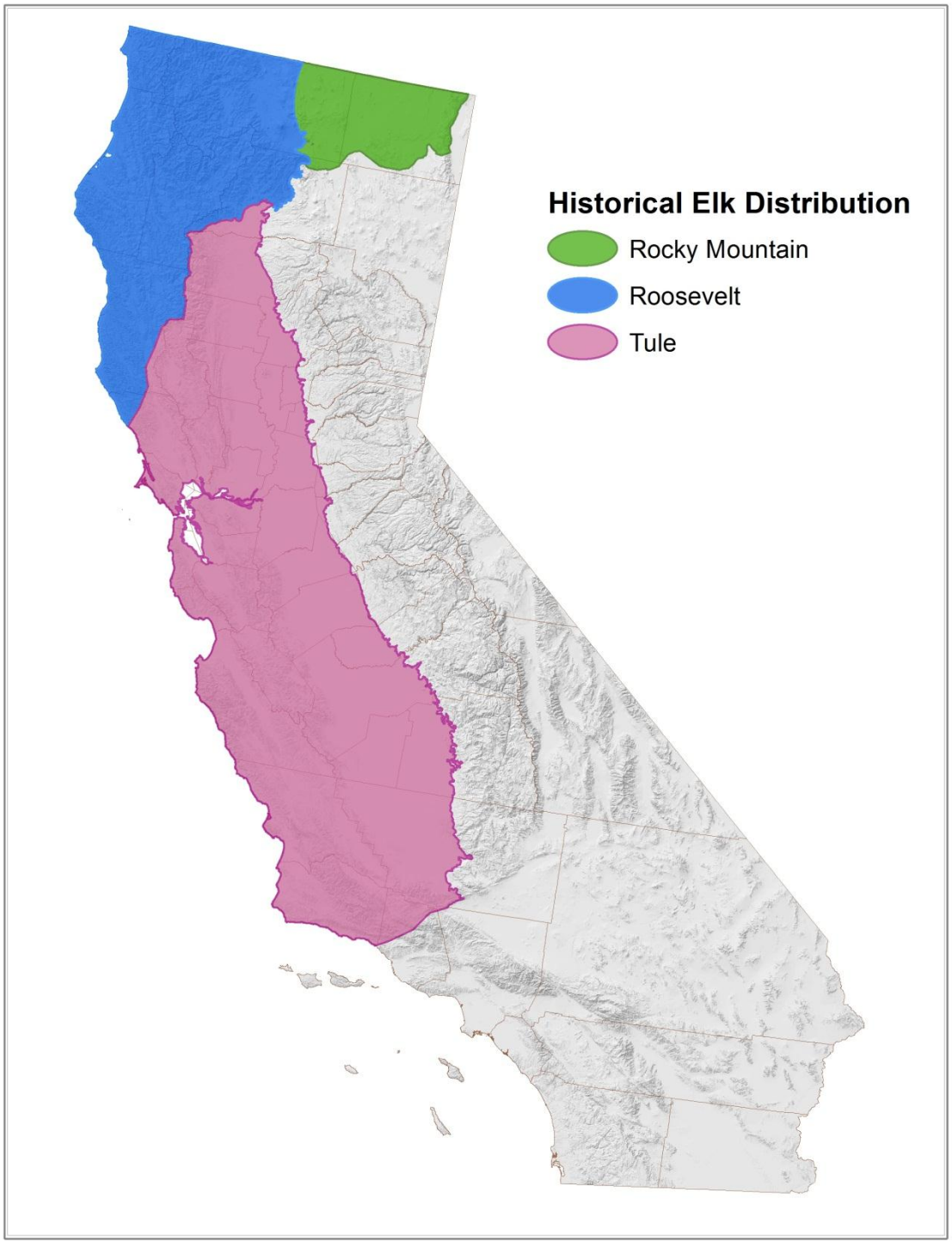
Appendix 13. New Hunt Boundary Map for Fort Hunter Liggett Central Coast



Appendix 14. Estimated Elk Distribution and Land Ownership, 2015



Appendix 15. Historic Elk Distribution within California



Appendix 16. Tule Elk Relocation Criteria

1. Free-roaming - Herds will be free-roaming and managed as part of the ecosystem.
2. Historical Range - Translocations are limited to historic range.
3. Habitat Quality - The site must contain suitable conditions for providing year-long elk habitat. This includes natural vegetation capable of providing forage and cover, adequate perennial water and relatively moderate climatic conditions receiving only moderate snow.
4. Hybridization with Other Elk - The site should provide no chance of contact with other subspecies of elk.
5. Potential for Public Use - Preference shall be given to sites which increase opportunities for public use of tule elk, including hunting. Preferred sites will be on or adjacent to accessible public lands.
6. Conflicts with Humans - Tule elk will not be translocated to areas with a potential for significant conflicts with humans (agriculture, highways, and subdivisions); the rights of private landowners must be respected. A site should have low potential for elk damage to private property. This includes livestock competition and damage to agricultural and silvicultural crops as well as other property such as fences and irrigation systems. Adjacent landowners should understand and support the proposed relocation of tule elk. Private landownership is dynamic, and acceptable conditions may become depredation problems with a change in land use or the sale of neighboring parcel. Written agreements with neighboring landowners are recommended.
7. Population Management - Practical means of regulating population size should be available for translocated tule elk herds.
8. Competition with Other Wildlife - The status of other native ungulates and threatened and endangered species in the area of a proposed tule elk translocation should be considered as well as the potential for adverse impacts from competition.
9. Disease - Elk should not be relocated from or to areas with a chronic disease history where disease may affect elk or other ungulates.
10. Existing Populations - Tule elk will not be relocated to sites with or immediately adjacent to existing populations, unless additional elk are needed to improve the status of a population.

Appendix 17. Existing Regulations
§364. Elk
(a) Department Administered General Methods Roosevelt Elk Hunts:
(1) Siskiyou Roosevelt Elk Hunt:
(A) Area: In that portion of Siskiyou County beginning at the junction of Interstate Highway 5 with the California-Oregon state line; east along the state line to Hill Road at Ainsworth Corner; south along Hill Road to Lava Beds National Monument Road; south along Lava Beds National Monument Road to USDA Forest Service Road 49; south along USDA Forest Service Road 49 to USDA Forest Service Road 77; west along USDA Forest Service Road 77 to USDA Forest Service Road 15 (Harris Spring Road); south along USDA Forest Service Road 15 to USDA Forest Service Road 13 (Pilgrim Creek Road); southwest along USDA Forest Service Road 13 to Highway 89; northwest along Highway 89 to Interstate Highway 5; north along Interstate Highway 5 to the point of beginning.
(B) Season: The season shall open on the Wednesday preceding the second Saturday in September and continue for 12 consecutive days.
(C) Number of License Tags: 20 bull tags and 20 antlerless tags.
(2) Big Lagoon Roosevelt Elk Hunt:
(A) Area: In that portion of Humboldt County owned or leased by the California Redwood Company and the Green Diamond Resource Company within a line beginning at the intersection of Highway 101 and Hiltons Road; south on Hiltons Road to the western boundary of Redwood National Park; south and east along the western to its southern tip; north and east along the eastern boundary of Redwood National Park to Redwood Creek; south along Redwood Creek to Highway 299; east along Highway 299 to Forest Service Road 1; south along Forest Service Road 1 to Roddiscraft Road; west along Roddiscraft Road to the intersection of Snow Camp Road and the power line road within the right-of-way of Humboldt-Trinity 115 Line and Trinity-Maple Creek 60 Line power line; west along the power line road within the right-of-way of the Humboldt-Trinity 115 Line and Trinity-Maple Creek 60 Line to Maple Creek Road; south along Maple Creek Road to Butler Valley Road; west along Butler Valley Road to Fickle Hill Road; north along Fickle Hill Road to Bayside Road; west along Bayside Road and 7th Street to Highway 101; north along Highway 101 to point of beginning.
(B) Season: The season shall open the last Wednesday in August and continue for 10 consecutive days.
(C) Number of License Tags: 0 bull tags and 0 antlerless tags.
(D) Special Conditions: All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
(3) Northwestern California Roosevelt Elk Hunt:
(A) Area: In those portions of Humboldt and Del Norte counties within a line beginning at the intersection of Highway 299 and Highway 96, north along Highway 96 to the Del Norte-Siskiyou county line, north along the Del Norte-Siskiyou county line to the California-Oregon state line, west along the state line to the Pacific Coastline, south along the Pacific coastline to the Humboldt-Mendocino county line, east along the Humboldt-Mendocino county line to the Humboldt-Trinity county line, north along the Humboldt-Trinity county line to Highway 299, west along Highway 299 to the point of

beginning, excluding those areas owned or leased by the California Redwood Company and the Green Diamond Resource Company within existing elk hunt boundaries as described in subsections 364(a)(2)(A), (a)(4)(A), and (a)(5)(A).
(B) Season: The season shall open on the first Wednesday in September and continue for 23 consecutive days.
(C) Number of License Tags: 0 bull tags, 0 antlerless tags, and 45 either-sex tags.
(4) Klamath Roosevelt Elk Hunt:
(A) Area: Those portions of Humboldt and Del Norte counties owned or leased by the Green Diamond Resource Company within a line beginning at the intersection of Highway 101 and the Klamath River; south on Highway 101 to South Klamath Beach Road; west on South Klamath Beach Road to the Redwood National Park boundary; southwest and south along the Redwood National Park boundary to Highway 101; south on Highway 101 to the Redwood National Park boundary; southeast along the Redwood National Park boundary to the Bald Hills Road; southeast along the Bald Hills Road to the Klamath River; northwest along the Klamath River to the point of beginning.
(B) Season: The season shall open on the first Wednesday in September and continue for 10 consecutive days.
(C) Number of License Tags: 0 bull tags and 0 antlerless tags.
(D) Special Conditions: All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
(5) Del Norte Roosevelt Elk Hunt:
(A) Area: Those portions of Del Norte County owned or leased by the Green Diamond Resource Company within a line beginning at the intersection of Highway 101 and the California-Oregon state line; south along Highway 101 to North Bank Road; southeast along North Bank Road to High Divide Road; northeast along High Divide Road to North Fork Smith River/Wimer Road; north along North Fork Smith River/Wimer Road to the California Oregon state line; west along the California-Oregon state line to the point of beginning.
(B) Season: The season shall open on the last Wednesday in August and continue for 10 consecutive days.
(C) Number of License Tags: 0 bull tags and 0 antlerless tags.
(D) Special Conditions: All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting upon receipt of their elk license tags.
(6) Marble Mountains Roosevelt Elk Hunt
(A) Area: In those portions of Humboldt, Tehama, Trinity, Shasta and Siskiyou counties beginning at the intersection of Interstate Highway 5 and the California-Oregon state line; west along the state line to the Del Norte County line; south along the Del Norte County line to the intersection of the Siskiyou-Humboldt county lines; east along the Siskiyou-Humboldt county lines to Highway 96; south along Highway 96 to Highway 299; south along Highway 299 to the Intersection of the Humboldt/Trinity County line; south along the Humboldt Trinity County Line to the intersection of Highway 36; east along Highway 36 to the intersection of Interstate 5;north on Interstate Highway 5 to the point of beginning.

(B) Season: The season shall open on the Wednesday preceding the second Saturday in September and continue for 12 consecutive days.
(C) Number of License Tags: General Season: 35 bull tags and 10 antlerless tags.
(b) Department Administered General Methods Rocky Mountain Elk Hunts:
(1) Northeastern California Rocky Mountain Elk Hunt:
(A) Area: Those portions of Siskiyou, Modoc, Lassen, and Shasta counties within a line beginning in Siskiyou County at the junction of the California-Oregon state line and Hill Road at Ainsworth Corner; east along the California-Oregon state line to the California-Nevada state line; south along the California-Nevada state line to the Tuledad-Red Rock-Clarks Valley Road (Lassen County Roads 506, 512 and 510); west along the Tuledad-Red Rock-Clarks Valley Road to Highway 395 at Madeline; west on USDA Forest Service Road 39N08 to the intersection of Highway 139/299 in Adin; south on Highway 139 to the intersection of Highway 36 in Susanville; west on Highway 36 to the intersection of Interstate 5 in Red Bluff; north on Interstate 5 to Highway 89; southeast along Highway 89 to USDA Forest Service Road 13 (Pilgrim Creek Road); northeast along USDA Forest Service Road 13 to USDA Forest Service Road 15 (Harris Spring Road); north along USDA Forest Service Road to USDA Forest Service Road 77; east along USDA Forest Service Road 77 to USDA Forest Service Road 49; north along USDA Forest Service Road 49 to Lava Beds National Monument Road; north along Lava Beds National Monument Road to Hill Road; north along Hill Road to the point of beginning.
(B) Season: The season shall open on the Wednesday preceding the third Saturday in September and continue for 12 consecutive days.
(C) Number of License Tags: 15 bull tags and 10 antlerless tags.
(c) Department Administered General Methods Roosevelt/Tule Elk Hunts:
(1) Mendocino Elk Hunt:
(A) Area: Those portions in Mendocino County within a line beginning at the Pacific Coastline and the Mendocino/Humboldt County line south of Shelter Cove; east along the Mendocino/Humboldt County line to the intersection of the Humboldt, Mendocino, and Trinity County lines; south and east along the Mendocino/Trinity County line to the intersection of the Mendocino, Trinity, and Tehama County lines; south along the Mendocino County line to the intersection of Highway 20; north and west along Highway 20 to the intersection of Highway 101 near Calpella; south along Highway 101 to the intersection of Highway 253; southwest along Highway 253 to the intersection of Highway 128; north along Highway 128 to the intersection of Mountain View Road near the town of Boonville; west along Mountain View Road to the intersection of Highway 1; south along Highway 1 to the intersection of the Garcia River; west along the Garcia River to the Pacific Coastline; north along the Pacific Coastline to the point of beginning.
(B) Season: The season shall open on the Wednesday preceding the fourth Saturday in September and continue for 12 consecutive days.
(C) Number of License Tags: 2 bull tags and 2 antlerless tags.
(d) Department Administered General Methods Tule Elk Hunts:
(1) Cache Creek Tule Elk Hunt:
(A) Area: Those portions of Lake, Colusa and Yolo counties within the following line: beginning at the junction of Highway 20 and Highway 16; south on Highway 16 to Reiff-Rayhouse Road; west on Reiff-Rayhouse Road to Morgan Valley Road; west on

Morgan Valley Road to Highway 53; north on Highway 53 to Highway 20; east on Highway 20 to the fork of Cache Creek; north on the north fork of Cache Creek to Indian Valley Reservoir; east on the south shore of Indian Valley Reservoir to Walker Ridge-Indian Valley Reservoir Access Road; east on Walker Ridge-Indian Valley Reservoir Access Road to Walker Ridge Road; south on Walker Ridge Road to Highway 20; east on Highway 20 to the point of beginning.
(B) Season:
1. The Bull season shall open on the second Saturday in October and continue for 16 consecutive days.
2. The Antlerless season shall open on the third Saturday in October and continue for 16 consecutive days.
(C) Number of License Tags: 3 bull tags and 3 antlerless tags.
(D) Special Conditions: All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
(2) La Panza Tule Elk Hunt:
(A) Area: In those portions of San Luis Obispo, Kern, Monterey, Kings, Fresno, San Benito, and Santa Barbara counties within a line beginning in San Benito County at the junction of Highway 25 and County Highway J1 near the town Pacines, south along Highway 25 to La Gloria road, west along La Gloria road, La Gloria road becomes Gloria road, west along Gloria road to Highway 101 near Gonzales, south along Highway 101 to Highway 166 in San Luis Obispo County; east along Highway 166 to Highway 33 at Maricopa in Kern County; north and west along Highway 33 to Highway 198 at Coalinga in Fresno County, north along Highway 33 to Interstate 5 in Fresno County, north along Interstate 5 to Little Panoche road/County Highway J1, southwest along Little Panoche road/County Highway J1 to the intersection of Little Panoche road/County Highway J1 and Panoche road/County Highway J1 in San Benito County, northwest along Panoche road/County Highway J1 to the point of beginning.
(B) Season:
1. Period One: The season shall open on the second Saturday in October and extend for 23 consecutive days.
2. For Period Two: the season shall open on the second Saturday in November and extend for 23 consecutive days.
(C) Number of License Tags:
1. Period One: 6 bull tags and 5 antlerless tags.
2. Period Two: 6 bull tags and 6 antlerless tags.
(D) Special Conditions: All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting upon receipt of their elk license tags.
(3) Bishop Tule Elk Hunt:
(A) Area: In that portion of Inyo County beginning at the junction of Highway 395 and Highway 6 in the town of Bishop; north and east along Highway 6 to the junction of Silver Canyon Road; east along Silver Canyon Road to the White Mountain Road (Forest Service Road 4S01); south along the White Mountain Road to Highway 168 at Westgard Pass; south and west along Highway 168 to the junction of Highway 395; north on Highway 395 to the point of beginning.

(B) Season:
1. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
2. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
3. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period Three: 2 bull tags and 0 antlerless tags.
2. Period Four: 0 bull tags and 0 antlerless tags.
3. Period Five: 0 bull tags and 0 antlerless tags.
(4) Independence Tule Elk Hunt:
(A) Area: In that portion of Inyo County beginning at the junction of Highway 395 and Aberdeen Station Road; east on Aberdeen Station Road to its terminus at the southern boundary of Section 5, Township 11S, Range 35E; east along the southern boundary of sections 5, 4, 3, and 2, Township 11S, Range 35E to the Papoose Flat Road at Papoose Flat; south and east on Papoose Flat Road to Mazourka Canyon Road; south and then west on Mazourka Canyon Road to Highway 395; west along Onion Valley Road to the intersection of the Section 25 Township 13S, Range 33E; south along the eastern boundary of Section 25 Township 13S, Range 33E to the southern boundary of Section 25 Township 13S, Range 33E; west along the southern boundary of sections 27, 26, 25 Township 13S, Range 33E to the Inyo County line; North along the Inyo County Line to Taboose Creek; east along Taboose Creek to the intersection of Highway 395; south along Highway 395 to the point of beginning.
(B) Season:
1. Period Two: The season shall open on the first Saturday in October and extend for 9 consecutive days.
2. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
3. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
4. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period Two: 2 bull tags and 0 antlerless tags.
2. Period Three: 0 bull tags and 0 antlerless tags.
3. Period Four: 0 bull tags and 0 antlerless tags.
4. Period Five: 0 bull tags and 0 antlerless tags.
(5) Lone Pine Tule Elk Hunt:
(A) Area: In that portion of Inyo County beginning at the junction of Highway 395 and Mazourka Canyon Road; east and then north on Mazourka Canyon Road to the Inyo National Forest Boundary at the junction of the southern boundary of Township 12S and the northern boundary of Township 13S; east along the southern boundary of Township 12S to Saline Valley Road; south on Saline Valley Road to Highway 190; north and then southwest on Highway 190 to the junction of Highway 395 at Olancha; north on Highway 395 to the point of beginning.

(B) Season:
1. Period Two: The season shall open on the first Saturday in October and extend for 9 consecutive days.
2. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
3. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
4. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period Two: 0 bull tags and 0 antlerless tags.
2. Period Three: 2 bull tags and 0 antlerless tags.
3. Period Four: 2 bull tags and 0 antlerless tags.
4. Period Five: 0 bull tags and 0 antlerless tags.
(6) Tinemaha Tule Elk Hunt:
(A) Area: In that portion of Inyo County beginning at the junction of Highway 395 and Highway 168 in the town of Big Pine; north and east along Highway 168 to the junction of the Death Valley Road; south and east along the Death Valley Road to the junction of the Papoose Flat Road; south along the Papoose Flat Road to the southern boundary of Section 2, Township 11S, Range 35E; west along the southern boundaries of sections 2, 3, 4 and 5 to the terminus of the Aberdeen Station Road in Section 5, Township 11S, Range 35E; south and west along the Aberdeen Station Road to Highway 395; north along Highway 395 to the point of beginning.
(B) Season:
1. Period Two: The season shall open on the first Saturday in October and extend for 9 consecutive days.
2. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
3. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
4. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period Two: 1 bull tag and 0 antlerless tags.
2. Period Three: 0 bull tags and 0 antlerless tags.
3. Period Four: 0 bull tags and 0 antlerless tags.
4. Period Five: 0 bull tags and 0 antlerless tags.
(7) West Tinemaha Tule Elk Hunt:
(A) Area: In that portion of Inyo County beginning at the junction of Highway 395 and Highway 168 in the town of Big Pine; south along Highway 395 to the north junction of Fish Springs Road; south along Fish Springs Road to the junction of Highway 395; south along Highway 395 to Taboose Creek in Section 14, Township 11S, Range 34E; west along Taboose Creek to the Inyo County line; north and west along the Inyo County line to the intersection of Tinemaha Creek; east along Tinemaha Creek to the intersection of McMurray Meadow Road; north on McMurray Meadow Road to the intersection of Glacier Lodge Road; north and east on Glacier Lodge Road to Crocker

Avenue; east along Crocker Avenue to Highway 395; north along Highway 395 to the point of beginning.
(B) Season:
1. Period One: The season shall open on the second Saturday in September and extend for 16 consecutive days.
2. Period Two: The season shall open on the first Saturday in October and extend for 9 consecutive days.
3. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
4. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
5. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period One: 0 bull tags and 0 antlerless tags.
2. Period Two: 0 bull tags and 0 antlerless tags.
3. Period Three: 0 bull tags and 0 antlerless tags.
4. Period Four: 0 bull tags and 0 antlerless tags.
5. Period Five: 0 bull tags and 0 antlerless tags.
(8) Tinemaha Mountain Tule Elk Hunt:
(A) Area: In that portion of Inyo County with a line beginning at the intersection of Glacier Lodge Road (9S21) and McMurray Meadow Road (9S03); south on McMurray Meadow Road to Tinemaha Creek; west along Tinemaha Creek to the Inyo County line; north and west along the Inyo County line to the southeast corner of Section 23, Township 10S, Range 32E; north along the eastern boundaries of sections 23, 14, 11, 2, Township 10S, Range 32E, and the eastern boundary of Section 36, Township 9S, Range 32E to Glacier Lodge Road; east along Glacier Lodge Road to the beginning.
(B) Season:
1. Period One: The season shall open on the second Saturday in September and extend for 16 consecutive days.
2. Period Two: The season shall open on the first Saturday in October and extend for 9 consecutive days.
3. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
4. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
5. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period One: 0 bull tags.
2. Period Two: 0 bull tags.
3. Period Three: 1 bull tag.
4. Period Four: 1 bull tag.
5. Period Five: 0 bull tags.
(9) Whitney Tule Elk Hunt:

(A) Area: In that portion of Inyo County with a line beginning at the intersection of Highway 395 and Onion Valley Road; south on Highway 395 to the intersection of Whitney Portal Road; west along Whitney Portal Road to the northern boundary of Section 36, Township 15S, Range 34E; west along the northern boundary of sections 36, 35, 34 and 33 Township 15S, Range 34 E to the Inyo County Line; north along the Inyo County Line to the intersection of Section 27 Township 13S, range 33E; east along the southern boundary of sections 27, 26 and 25 Township 13S, Range 33E; north along the eastern boundary of Section 25 Township 13S, Range 33E to the intersection of Onion Valley Road; east along Onion Valley Road to the point of beginning.
(B) Season:
1. Period Two: The season shall open on the first Saturday in October and extend for 9 consecutive days.
2. Period Three: The season shall open on the third Saturday in October and extend for 9 consecutive days.
3. Period Four: The season shall open on the first Saturday in November and extend for 9 consecutive days.
4. Period Five: The season shall open on the first Saturday in December and continue for 9 consecutive days.
(C) Number of License Tags:
1. Period Two: 1 bull tag and 0 antlerless tags.
2. Period Three: 1 bull tag and 0 antlerless tags.
3. Period Four: 0 bull tags and 0 antlerless tags.
4. Period Five: 0 bull tags and 0 antlerless tags.
(10) Grizzly Island Tule Elk Hunt:
(A) Area: Those lands owned and managed by the Department of Fish and Game as the Grizzly Island Wildlife Area.
(B) Season:
1. Period One: The season for antlerless elk shall open on the Tuesday after the second Saturday in August and continue for 4 consecutive days, whereas the season for bulls and spike bulls shall open on the Thursday after the second Saturday in August and continue for 4 consecutive days.
2. Period Two: The season for antlerless elk shall open on the Tuesday after the third Saturday in August and continue for 4 consecutive days, whereas the season for bulls and spike bulls shall open on the Thursday after the third Saturday in August and continue for 4 consecutive days.
3. Period Three: The season for antlerless elk shall open on the Tuesday after the fourth Saturday in August and continue for 4 consecutive days, whereas the season for bulls and spike bulls shall open on the Thursday after the first Monday in September and continue for 4 consecutive days.
4. Period Four: The season for antlerless elk shall open on the second Tuesday in September and continue for 4 consecutive days, whereas the season for bulls and spike bulls shall open on Thursday following the second Tuesday in September and continue for 4 consecutive days.
5. Period Five: The season for antlerless elk shall open on the third Tuesday in September and continue for 4 consecutive days, whereas the season for bulls and spike

bulls shall open on the Thursday following the third Tuesday in September and continue for 4 consecutive days.
(C) Number of License Tags:
1. Period One: 0 bull tags, 4 spike bull tags, and 5 antlerless tags.
2. Period Two: 0 bull tags, 3 spike bull tags, and 8 antlerless tags.
3. Period Three: 0 bull tags, 2 spike bull tags, and 8 antlerless tags.
4. Period Four: 2 bull tags, 0 spike bull tags, and 8 antlerless tags.
5. Period Five: 2 bull tags, 2 spike bull tags, and 8 antlerless tags.
(D) Special Conditions: All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
(11) Fort Hunter Liggett General Public Tule Elk Hunt:
(A) Area: That portion of Monterey County lying within the exterior boundaries of Fort Hunter Liggett, except as restricted by the Commanding Officer.
(B) Season:
1. Period One: The season shall open on the first Tuesday in November and continue for 9 consecutive days.
2. Period Two: The season shall open on the Tuesday preceding the fourth Thursday in November and continue for 9 consecutive days.
3. Period Three: The season shall open on the Saturday preceding December 25 and continue for 14 consecutive days.
(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags:
1. Period One: 4 antlerless tags.
2. Period Two: 4 antlerless tags.
3. Period Three: 4 bull tags.
(E) Special Conditions:
1. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
3. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
4. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(12) East Park Reservoir Tule Elk Hunt:
(A) Area: In those portions of Glenn and Colusa counties within a line beginning in Glenn County at the junction of Interstate Highway 5 and Highway 162 at Willows; west along Highway 162 (Highway 162 becomes Alder Springs Road) to the Glenn-Mendocino County line; south along the Glenn-Mendocino County line to the Glenn-Lake County line; east and then south along the Glenn-Lake County line to the Colusa-Lake County line; west, and then southeast along the Colusa-Lake County line to Goat Mountain Road; north and east along Goat Mountain Road to the Lodoga-Stonyford

Road; east along the Lodoga-Stonyford Road to the Sites-Lodoga Road at Lodoga; east along the Sites-Lodoga Road to the Maxwell-Sites Road at Sites; east along the Maxwell-Sites Road to Interstate Highway 5 at Maxwell; north along Interstate Highway 5 to the point of beginning.
(B) Season: The season shall open the first Saturday in September and continue for 27 consecutive days.
(C) Number of License Tags: 2 bull tags and 2 antlerless tags.
(D) Special Conditions:
1. All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Access to private land may be restricted or require payment of an access fee.
3. A Colusa County ordinance prohibits firearms on land administered by the USDI Bureau of Reclamation in the vicinity of East Park Reservoir. A variance has been requested to allow use of muzzleloaders (as defined in Section 353) on Bureau of Reclamation land within the hunt zone.
(13) San Luis Reservoir Tule Elk Hunt:
(A) Area: In those portions of Merced, Fresno, San Benito, and Santa Clara counties within a line beginning in Merced County at the junction of Highway 152 and Interstate 5 near the town of Santa Nella, west along Highway 152 to Highway 156 in Santa Clara County, southwest along Highway 156 to Highway 25 near the town of Hollister in San Benito County, south along Highway 25 to the town of Paicine, south and east along J1 to Little Panoche Road, North and east along Little Panoche Road to Interstate 5 in Fresno County, north along Interstate 5 to the point of beginning.
(B) Season: The season shall open on the first Saturday in October and continue for 23 consecutive days.
(C) Number of License Tags: 0 bull tags, 0 antlerless tags, and 5 either-sex tags.
(14) Bear Valley Tule Elk Hunt:
(A) Area: in those portions of Colusa, Lake, and Yolo counties within a line beginning in Colusa County at the junction of Interstate Highway 5 and Maxwell Sites Road at Maxwell; west along Maxwell Sites Road to the Sites Lodoga Road; west along the Sites Lodoga Road to Lodoga Stonyford Road; west along Lodoga Stonyford Road to Goat Mountain Road; west and south along Goat Mountain Road to the Colusa-Lake County line; south and west along the Colusa-Lake County line to Forest Route M5; south along Forest Route M5 to Bartlett Springs Road; east along Bartlett Springs Road to Highway 20; east on Highway 20 to the fork of Cache Creek; north on the north fork of Cache Creek to Indian Valley Reservoir to Walker Ridge-Indian Valley Reservoir Access Road; east on Walker Ridge-Indian Valley Reservoir Access Road to Walker Ridge Road; south on Walker Ridge Road to Highway 20; east on Highway 20 to Highway 16; south on Highway 16 to Rayhouse Road; south and west on Rayhouse Road to the Yolo-Napa County line; east and south along the Yolo-Napa County line to Road 8053; east on Road 8053 to County Road 78A; east on County Road 78A to Highway 16; east on Highway 16 to Route E4 at Capay; north and east on Route E4 to Interstate Highway 5; north on Interstate Highway 5 to the point of beginning.
(B) Season: The season shall open on the second Saturday in October and continue for 9 consecutive days.

(C) Number of License Tags: 3 bull tags and 2 antlerless tags.
(15) Lake Pillsbury Tule Elk Hunt:
(A) Area: in those portions of Lake County within a line beginning at the junction of the Glenn-Lake County line and the Mendocino County line; south and west along the Mendocino-Lake County line to Highway 20; southeast on Highway 20 to the intersection of Bartlett Springs Road; north and east along Bartlett Springs Road to the intersection of Forest Route M5; northwest on Forest Route M5 to the Colusa-Lake County Line; northwest and east on the Colusa-Lake County Line to the junction of the Glenn-Colusa County Line and the Lake-Glenn County Line; north and west on the Lake-Glenn County Line to the point of beginning.
(B) Season:
1. Antlerless Season. The antlerless season shall open on the Wednesday preceding the second Saturday in September and continue for 10 consecutive days.
2. Bull Season. The bull season shall open Monday following the fourth Saturday in September and continue for 10 consecutive days.
(C) Number of License Tags: 2 bull tags and 4 antlerless tags.
(16) Santa Clara Tule Elk Hunt:
(A) Area: Those portions of Merced, Santa Clara, and Stanislaus Counties within the following line: beginning at the intersection of the Interstate 5 and the San Joaquin/Stanislaus County line; southeast along Interstate 5 to the intersection of Highway 152; west along Highway 152 to the intersection of Highway 101 near the town of Gilroy; north along Highway 101 to the intersection of Interstate 680 near San Jose; north along Interstate 680 to the intersection of the Alameda/Santa Clara County line; east along the Alameda/Santa Clara County line to the intersection of the San Joaquin, Stanislaus, Alameda, Santa Clara County lines; northeast along the San Joaquin/Stanislaus County line to the point of beginning.
(B) Season: The season shall open on the second Saturday in October and continue for 16 consecutive days.
(C) Number of License Tags: 0 bull tags.
(17) Alameda Tule Elk Hunt:
(A) Area: Those portions of Alameda and San Joaquin Counties within the following line: beginning at the intersection of the Interstate 5 and the San Joaquin/Stanislaus County line; southwest along the San Joaquin/Stanislaus County line to the intersection of the San Joaquin, Stanislaus, Alameda, Santa Clara County lines; west along the Alameda/Santa Clara County Line to the intersection of Interstate 680; north along Interstate 680 to the intersection of Interstate 580; east and south along Interstate 580 to the intersection of Interstate 5; south along Interstate 5 to the point of beginning.
(B) Season: The season shall open on the second Saturday in October and continue for 16 consecutive days.
(C) Number of License Tags: 0 bull tags.
(e) Department Administered General Methods Apprentice Elk Hunts:
(1) Marble Mountains Roosevelt Apprentice Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(a)(6)(A).
(B) Season: The season shall open on the Wednesday preceding the second Saturday in September and continue for 12 consecutive days.
(C) Number of License Tags: 2 either-sex tags.

(D) Special Conditions: Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
(2) Northeastern California Rocky Mountain Apprentice Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(b)(1)(A).
(B) Season: The season shall open on the Wednesday preceding the third Saturday in September and continue for 12 consecutive days.
(C) Number of License Tags: Apprentice Season: 2 either-sex tags.
(D) Special Conditions: Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt License tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
(3) Cache Creek Tule Elk Apprentice Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(1)(A).
(B) Season: The season shall open on the second Saturday in October and continue for 16 consecutive days.
(C) Number of License Tags: Apprentice Season: 1 bull tag.
(D) Special Conditions:
1. All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting upon receipt of their elk license tags.
2. Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
(4) La Panza Tule Elk Apprentice Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(2)(A).
(B) Season: Period One shall open on the second Saturday in October and extend for 23 consecutive days.
(C) Number of License Tags: Period One: 1 antlerless tag and 0 bull tags.
(D) Special Conditions:
1. All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunter tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
(5) Bishop Tule Elk Apprentice Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(3)(A).
(B) Season: Period Two shall open on the first Saturday in October and extend for 9 consecutive days.
(C) Number of License Tags: Period Two: 0 bull tags and 0 antlerless tags.
(D) Special Conditions: Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.

(6) Grizzly Island Tule Elk Apprentice Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(10)(A).
(B) Season:
1. Period One Season for antlerless elk shall open on the Tuesday after the second Saturday in August and continue for 4 consecutive days, whereas the season for spike bulls shall open on the Thursday after the second Saturday in August and continue for 4 consecutive days.
2. Period Two Season for spike bulls shall open on the Thursday after the third Saturday in August and continue for 4 consecutive days.
(C) Number of License Tags:
1. Period One: 3 antlerless tags and 1 spike bull tag.
2. Period Two: 2 spike bull tags.
(D) Special Conditions:
1. All tagholders will be required to attend a mandatory orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
(7) Fort Hunter Liggett General Public Tule Elk Apprentice Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season: The season shall open on the Saturday preceding December 25 and continue for 14 consecutive days.
(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags: 1 bull tag and 1 antlerless tags.
(E) Special Conditions:
1. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
3. Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
4. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
5. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(f) Department Administered Archery Only Elk Hunts:
(1) Northeastern California Rocky Mountain Archery Only Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(b)(1)(A).
(B) Season: The season shall open on the Wednesday preceding the first Saturday in September and continue for 12 consecutive days
(C) Number of License Tags: 10 either-sex tags.

(E) Special Conditions: Elk may be taken with Archery Equipment only as specified in Section 354.
(2) Owens Valley Multiple Zone Tule Elk Archery Only Hunt:
(A) Area: The tag shall be valid in areas described in subsections 364(d)(3)(A), (d)(4)(A), (d)(5)(A), (d)(8)(A), and (d)(9)(A).
(B) Season: The season shall open on the second Saturday in August and extend for 9 consecutive days.
(C) Number of License Tags: 5 bull tags and 0 antlerless tags.
(D) Special Conditions: Elk may be taken with Archery Equipment only as specified in Section 354.
(3) Lone Pine Tule Elk Archery Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(5)(A).
(B) Season: Period One Season shall open on the second Saturday in September and extend for 16 consecutive days.
(C) Number of License Tags: Period One: 0 bull tags and 0 antlerless tags.
(D) Special Conditions: Elk may be taken with Archery Equipment only as specified in Section 354.
(4) Tinemaha Tule Elk Archery Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(6)(A).
(B) Season: Period One Season shall open on the second Saturday in September and extend for 16 consecutive days.
(C) Number of License Tags: Period One: 1 bull tag and 0 antlerless tags.
(D) Special Conditions: Elk may be taken with Archery Equipment only as specified in Section 354.
(5) Whitney Tule Elk Archery Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(9)(A).
(B) Season: Period One Season shall open on the second Saturday in September and extend for 16 consecutive days.
(C) Bag and Possession Limit: 1 elk per season.
(D) Number of License Tags: Period One: 0 bull tags and 0 antlerless tags.
(E) Special Conditions: Elk may be taken with Archery Equipment only as specified in Section 354.
(6) Fort Hunter Liggett General Public Tule Elk Archery Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season:
1. Either-sex season shall open on the last Wednesday in July and continue for 9 consecutive days.
2. Antlerless Season shall open on the last Wednesday in September and continue for 9 consecutive days.
(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags: 2 either-sex tags and 4 antlerless tags.
(E) Special Conditions:
1. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.

2. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
3. Elk may be taken with Archery Equipment only as specified in Section 354.
4. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
5. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(g) Department Administered Muzzleloader Only Elk Hunts:
(1) Bishop Tule Elk Hunt Muzzleloader Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(3)(A).
(B) Season: Period One Season shall open on the second Saturday in September and extend for 16 consecutive days.
(C) Number of License Tags: Period One: 1 bull tag and 0 antlerless tags.
(D) Special Conditions: Elk may be taken with muzzleloader equipment only as specified in Section 353.
(2) Independence Tule Elk Muzzleloader Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(4)(A).
(B) Season: Period One Season shall open on the second Saturday in September and extend for 16 consecutive days.
(C) Number of License Tags: Period One: 1 bull tag and 0 antlerless tags.
(D) Special Conditions: Elk may be taken with muzzleloader equipment only as specified in Section 353.
(3) Fort Hunter Liggett General Public Tule Elk Muzzleloader Only Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season: The season shall open on the Wednesday preceding the fourth Thursday in November and continue for 9 consecutive days.
(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags: 0 bull tags.
(E) Special Conditions:
1. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
3. Elk may be taken with Muzzleloader Equipment only as specified in Section 353.
4. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
5. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(h) Department Administered Muzzleloader/Archery Only Elk Hunts:
(1) Marble Mountains Roosevelt Elk Muzzleloader/Archery Only Elk Hunt.
(A) Area: The tag shall be valid in the area described in subsection 364(a)(6)(A).

(B) Season: The Season shall open on the last Saturday in October and extend for 9 consecutive days.
(C) Number of License Tags: 5 either-sex tags.
(D) Special Conditions: Elk may be taken with archery or muzzleloader equipment only as specified in Sections 353 and 354.
(i) Fund Raising Elk Tags:
(1) Multi-zone Fund Raising License Tag.
(A) Area: The tag shall be valid in the areas described in subsections 364(a)(1)(A), (a)(3)(A), (a)(6)(A), (b)(1)(A), and (d)(2)(A).
(B) Season: The tag shall be valid during the following seasons.
1. Siskiyou and Marble Mountains Roosevelt Elk Season shall open on the Wednesday preceding the first Saturday in September and continue for 19 consecutive days.
2. Northwestern Roosevelt Elk Season shall open on last Wednesday in August and continue for 30 consecutive days.
3. Northeastern Rocky Mountain Elk Season shall open on the Wednesday preceding the last Saturday in August and continue for 33 consecutive days.
4. La Panza Tule Elk Season shall open on the first Saturday in October and extend for 65 consecutive days.
(C) Number of License Tags: 1 bull tag.
(2) Grizzly Island Fund Raising License Tag.
(A) Area: The tag shall be valid in the area described in subsection 364(d)(10)(A).
(B) Season: The Season shall open on the first Saturday in August and continue for 30 consecutive days, with advance reservations required by contacting the Grizzly Island Wildlife Area by telephone at (707) 425-3828.
(C) Number of License Tags: 1 bull tag.
(3) Owens Valley Fund Raising License Tag.
(A) Area: The tag shall be valid in areas described in subsections 364(d)(3)(A), (d)(4)(A), (d)(5)(A), (d)(6)(A), (d)(7)(A), (d)(8)(A), and (d)(9)(A).
(B) Season: The Season shall open on the last Saturday in July and extend for 30 consecutive days.
(C) Number of License Tags: 1 bull tag.
(j) Military Only Elk Tags. These hunts are sponsored and tag quotas are set by the Department. The tags are assigned and the hunts are administered by the Department of Defense.
(1) Fort Hunter Liggett Military General Methods Tule Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season:
1. The Early Season shall open on the third Monday in August and continue for 5 consecutive days and reopen on the fourth Monday in August and continue for 5 consecutive days.
2. Period One: The season shall open on the first Tuesday in November and continue for 9 consecutive days.
3. Period Two: The season shall open on the Tuesday preceding the fourth Thursday in November and continue for 9 consecutive days.
4. Period Three: The season shall open on the Saturday preceding December 25 and continue for 14 consecutive days.

(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags:
1. Early Season: 2 bull tags and 1 antlerless tag.
2. Period One: 4 antlerless tags.
3. Period Two: 4 antlerless tags.
4. Period Three: 4 bull tags.
(E) Special Conditions:
1. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
3. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
4. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(2) Fort Hunter Liggett Military Apprentice Tule Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season: The season shall open on the Saturday preceding December 25 and continue for 14 consecutive days.
(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags: 1 bull tag and 1 antlerless tags.
(E) Special Conditions:
1. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting after receipt of their elk license tags.
2. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
3. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
4. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
5. Only persons possessing valid junior hunting licenses may apply for Apprentice Hunt license tags. Apprentice Hunt tagholders shall be accompanied by a nonhunting, licensed adult chaperon 18 years of age or older while hunting.
(3) Fort Hunter Liggett Military Archery Only Tule Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season:
1. Either-sex season shall open on the last Wednesday in July and continue for 9 consecutive days.
2. Antlerless Season shall open on the last Wednesday in September and continue for 9 consecutive days.

(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags: 2 either-sex tags and 4 antlerless tags.
(E) Special Conditions:
1. Elk may be taken with Archery Equipment only as specified in Section 354.
2. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting upon receipt of their elk license tags.
3. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
4. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
5. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(4) Fort Hunter Liggett Military Muzzleloader Only Tule Elk Hunt:
(A) Area: The tag shall be valid in the area described in subsection 364(d)(11)(A).
(B) Season: The season shall open on the Wednesday preceding the fourth Thursday in November and continue for 9 consecutive days.
(C) Due to military operations, season dates are subject to further restriction, or may be rescheduled between August 1 and January 31 by the Commanding Officer.
(D) Number of License Tags: 0 bull tags.
(E) Special Conditions:
1. Elk may be taken with Muzzleloader Equipment only as specified in Section 353.
2. All tagholders will be required to attend a mandatory hunter orientation. Tagholders will be notified of the time and location of the orientation meeting upon receipt of their elk license tags.
3. Tagholders shall be required to purchase an annual hunting pass available from Fort Hunter Liggett.
4. All successful tagholders will be required to have their tags validated on Fort Hunter Liggett prior to leaving. All unsuccessful tag holders will be required to turn in their unfilled tags to Fort Hunter Liggett immediately upon completion of their hunt.
5. Season dates and hunt areas are subject to restriction by the Commanding Officer of Fort Hunter Liggett based on military training.
(k) Bag and Possession Limit: Each elk tag is valid only for one elk per season and only in the hunt area drawn. Hunt areas are described in subsections 364(a), (b), (c), (d), (e), (f), (g), (h), and (j) and persons shall only be eligible for one elk tag per season.
(*l*) Definitions:
(1) Bull elk: Any elk having an antler or antlers at least four inches in length as measured from the top of the skull.
(2) Spike bull: A bull elk having no more than one point on each antler. An antler point is a projection of the antler at least one inch long and longer than the width of its base.
(3) Antlerless elk: Any elk, with the exception of spotted calves, with antlers less than four inches in length as measured from the top of the skull.

(4) Either-sex elk: For the purposes of these regulations, either-sex is defined as bull elk, as described in subsection 364(*l*)(1), or antlerless elk as, described in subsection 364(*l*)(3).
(m) Method of Take: Only methods for taking elk as defined in Sections 353 and 354 may be used.
(n) General Method of take are those methods defined in Sections 353 and 354.
(o) Tagholder Responsibilities:
(1) No tagholder shall take or possess any elk or parts thereof governed by the regulations except herein provided.
(2) The department reserves the right to use any part of the tagholder's elk for biological analysis as long as the amount of edible meat is not appreciably decreased.
(3) Any person taking an elk which has a collar or other marking device attached to it shall provide the department with such marking device within 10 days of taking the elk.
(p) The use of dogs to take or attempt to take elk is prohibited.
Note: Authority cited: Sections 200, 202, 203, 332 and 1050, Fish and Game Code. Reference: Sections 203, 203.1, 332, 713 and 1050, Fish and Game Code.

§ 364.1. SHARE Elk Hunts.
(a) Department Administered Shared Habitat Alliance for Recreational Enhancement (SHARE) Elk Hunts:
(1) Siskiyou Roosevelt Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(a)(1)(A). Individual property boundaries will be identified in the SHARE application package.
(2) Big Lagoon Roosevelt Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(a)(2)(A). Individual property boundaries will be identified in the SHARE application package.
(3) Northwestern California Roosevelt Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(a)(3)(A). Individual property boundaries will be identified in the SHARE application package.
(4) Klamath Roosevelt Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(a)(4)(A). Individual property boundaries will be identified in the SHARE application package.
(5) Del Norte Roosevelt Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(a)(5)(A). Individual property boundaries will be identified in the SHARE application package.
(6) Marble Mountains Roosevelt Elk SHARE Hunt
(A) Area: Within the boundaries identified in 364(a)(6)(A). Individual property boundaries will be identified in the SHARE application package.
(7) Northeastern California Rocky Mountain Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(b)(1)(A). Individual property boundaries will be identified in the SHARE application package.
(8) Mendocino Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(c)(1)(A). Individual property boundaries will be identified in the SHARE application package.
(9) Cache Creek Tule Elk SHARE Hunt:

(A) Area: Within the boundaries identified in 364(d)(1)(A). Individual property boundaries will be identified in the SHARE application package.
(10) La Panza Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(2)(A). Individual property boundaries will be identified in the SHARE application package.
(11) Bishop Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(3)(A). Individual property boundaries will be identified in the SHARE application package.
(12) Independence Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(4)(A). Individual property boundaries will be identified in the SHARE application package.
(13) Lone Pine Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(5)(A). Individual property boundaries will be identified in the SHARE application package.
(14) Tinemaha Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(6)(A). Individual property boundaries will be identified in the SHARE application package.
(15) West Tinemaha Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(7)(A). Individual property boundaries will be identified in the SHARE application package.
(16) Tinemaha Mountain Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(8)(A). Individual property boundaries will be identified in the SHARE application package.
(17) Whitney Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(9)(A). Individual property boundaries will be identified in the SHARE application package.
(18) Grizzly Island Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(10)(A). Individual property boundaries will be identified in the SHARE application package.
(19) Fort Hunter Liggett General Public Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(11)(A). Individual property boundaries will be identified in the SHARE application package.
(20) East Park Reservoir Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(12)(A). Individual property boundaries will be identified in the SHARE application package.
(21) San Luis Reservoir Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(13)(A). Individual property boundaries will be identified in the SHARE application package.
(22) Bear Valley Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(14)(A). Individual property boundaries will be identified in the SHARE application package.
(23) Lake Pillsbury Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(15)(A). Individual property boundaries will be identified in the SHARE application package.
(24) Santa Clara Tule Elk SHARE Hunt:

(A) Area: Within the boundaries identified in 364(d)(16)(A). Individual property boundaries will be identified in the SHARE application package.
(25) Alameda Tule Elk SHARE Hunt:
(A) Area: Within the boundaries identified in 364(d)(17)(A). Individual property boundaries will be identified in the SHARE application package.
(b) Season: The overall season shall open on the August 15 through January 31. Individual SHARE properties will be assigned seasons corresponding with management goals.
(c) Number of SHARE Elk License Tags

364.1	**2015 SHARE Elk Tag Allocation**				
§	Hunt Name	Bull	Antlerless	Either-sex	Spike
(1)	Siskiyou	10	10		
(2)	Big Lagoon	0	0		
(3)	Northwestern California	0	0	0	
(4)	Klamath	0	0		
(5)	Del Norte	0	0		
(6)	Marble Mountains	5	10		
(7)	Northeastern California	0	0		
(8)	Mendocino	2	2		
(9)	Cache Creek	1	1		
(10)	La Panza	12	11		
(11)	Bishop	0	0		
(12)	Independence	0	0		
(13)	Lone Pine	0	0		
(14)	Tinemaha	0	0		
(15)	West Tinemaha	0	0		
(16)	Tinemaha Mountain	0			
(17)	Whitney	0	0		
(18)	Grizzly Island	0	0		0
(19)	Fort Hunter Liggett	0	0	0	
(20)	East Park Reservoir	2	4		
(21)	San Luis Reservoir	0	0	5	
(22)	Bear Valley	1	0		
(23)	Lake Pillsbury	0	0		
(24)	Santa Clara	0			
(25)	Alameda	0			

(d) Bag and Possession Limit: Each elk tag is valid only for one elk per season and only in the SHARE hunt area drawn, and persons shall only be eligible for one elk tag per season.
(e) Definitions:

(1) Bull elk: Any elk having an antler or antlers at least four inches in length as measured from the top of the skull.
(2) Spike bull: A bull elk having no more than one point on each antler. An antler point is a projection of the antler at least one inch long and longer than the width of its base.
(3) Antlerless elk: Any elk, with the exception of spotted calves, with antlers less than four inches in length as measured from the top of the skull.
(4) Either-sex elk: For the purposes of these regulations, either-sex is defined as bull elk or antlerless elk.
(f) Method of Take: Only methods for taking elk as defined in Sections 353 and 354 may be used.
(g) Tagholder Responsibilities:
(1) No tagholder shall take or possess any elk or parts thereof governed by the regulations except herein provided.
(2) The department reserves the right to use any part of the tagholder's elk for biological analysis as long as the amount of edible meat is not appreciably decreased.
(3) Any person taking an elk which has a collar or other marking device attached to it shall provide the department with such marking device within 10 days of taking the elk.
(h) The use of dogs to take or attempt to take elk is prohibited.
(i) Applicants shall apply for a SHARE Access Permit, and pay a nonrefundable application fee as specified in Section 602, through the department’s Automated License Data System terminals at any department license agent, department license sales office or online.
(j) Upon receipt of winner notification successful applicants shall submit the appropriate tag fee as specified in Section 702 through any department license sales office or online through the department’s Automated License Data System.

Note: Authority Cited: Sections 332 and 1050, Fish and Game Code. Reference: Sections 332, 1050 and 1574, Fish and Game Code.

Appendix 18. 2015 PLM List and Authorized Harvest

PLM Name	Authorized Bull Harvest	Authorized Antlerless Harvest
ALEXANDER RANCH	1	2
ALEXANDER DAIRY	2	2
AMANN RANCH	1	
AVENALES RANCH	3	
BARDIN RANCH	2	4
BIG LAGOON	3	
BLACK RANCH	1	1
CAMP 5 OUTFITTERS (MORISOLI)	3	3
CAPISTRAN RANCH	2	2
CARNAZA WILDLIFE MGT AREA	3	3
CARRIZO RANCH	3	4
CHIMNEY ROCK RANCH	2	2
CLARK AND WHITE RANCH	3	2
D-RAFTER L RANCH	1	1
CONNOLLY/CORRAL HOLLOW RANCH	1	1
COTTRELL RANCH	1	1
DEFRANCESCO AND EATON	2	1
EDEN VALLEY RANCH	8	7
FULTON RANCH	1	
GABILAN RANCH	3	1
HARTNELL RANCH	1	2
HEARST RANCH	6	6
HUNTER RANCH	1	
INDIAN VALLEY CATTLE CO.	3	2
ISABEL VALLEY RANCH	1	
JS RANCH	1	
KLAMATH RANCH	2	
LEWIS RANCH	1	1
LONE RANCH	3	2
MILLER-ERIKSEN RANCH	1	
PBM FARMS	1	
PEACHTREE RANCH	4	2
POTTER VALLEY WMA	6	10
RANCHO LA CUESTA	3	1
REDWOOD HOUSE RANCH	1	
ROOSTER COMB RANCH	1	
ROSEBERG RESOURCES PONDOSA	2	2
R-R RANCH	3	6
SHAMROCK RANCH	8	10
SLICK ROCK RANCH	1	
SMITH RIVER	3	6
SPRING VALLEY RANCH	4	
STOVER RANCH	4	2
SUMMER CAMP RANCH	1	
SWEETWATER RANCH	1	
TEJON RANCH	12	3
TEMBLOR WMA	7	12
TRINCHERO RANCH	2	
WIGGINS RANCH	2	2
WORK RANCH	2	4
TOTALS	**134**	**110**

Appendix 19. Section 555, Title 14, CCR

§ 555. Cooperative Elk Hunting Areas.

To encourage protection and enhancement of elk habitat and provide eligible landowners an opportunity for limited elk hunting on their lands, the department may establish cooperative elk hunting areas and issue license tags to allow the take of elk as specified in Section 364, and subject to the following conditions:

(a) Definition and Scope. A cooperative elk hunting area is an area of private land located within the boundary of an area open to public elk hunting (as identified in Section 364). Minimum size of a cooperative elk hunting area shall be 5,000 acres, except that contiguous parcels of at least 640 acres in size may be combined to comprise a cooperative elk hunting area. Within an area open to public elk hunting, the number of cooperative elk hunting license tags issued shall not exceed 20 percent of the number of public license tags for the corresponding public hunt and shall be of the same designation (i.e., antlerless, spike bull, bull or either-sex) as the public license tags.

(b) Application Process. Application forms are available from the department's headquarters and regional offices. A person (as defined by Fish and Game Code Section 67) owning at least 640 acres within a cooperative elk hunting area shall be eligible to apply for a cooperative elk hunting area permit. Applicants shall designate one individual eligible to receive one elk license tag by the date indicated under subsection (3) below. Such individuals shall be at least 12 years of age and possess a valid California hunting license. A person may annually submit a cooperative elk hunting area application where they own sufficient habitat as described in subsection (a) above, for each public hunt area in which their property occurs.

(1) Applications shall be submitted to the department's regional office nearest the proposed cooperative elk hunting area. Department of Fish and Game regional offices are located as follows:

Northern California and North Coast Region, 601 Locust Street, Redding 96001 (530) 225-2300

Sacramento Valley and Central Sierra Region, 1701 Nimbus Road, Rancho Cordova 95670 (916) 358-2900

Central Coast Region, 7329 Silverado Trail, Box 47, Yountville 94599 (707) 944-5500

San Joaquin Valley and Southern Sierra Region, 1234 East Shaw Avenue, Fresno 93710 (559) 243-4005

South Coast Region, 4949 View Crest Avenue, San Diego 92123 (858) 467-4201

Eastern Sierra and Inland Deserts Region, 4775 Bird Farm Road, Chino Hills 91709 (909) 597-9823

(2) Completed applications must be received by the first business day following July 1. Only those applications that are filled out completely will be accepted. The Department will evaluate applications to determine if the specified parcels are of sufficient size within the boundary of a public elk hunt area, and contain important elk habitat. Rejected applications and those that are incomplete will be returned within 15 days of receipt by the department. If the number of accepted applications exceeds the license tags available, the department will determine successful applicants and a list of alternates by conducting a random drawing from the pool of qualified applicants as soon as possible after the application deadline. For any license year that the demand for cooperative elk hunting license tags within an area open to public hunting (as identified in Section 364) exceeds the number of tags available, tags will be first issued to applicants that did not

receive a tag the previous year. If the quota is not filled, tags will be issued to the remaining applicants by random drawing.
(3) Successful applicants will be notified by the department as soon as possible after the application deadline. Applicants shall submit the name, address, and valid California hunting license number of designated elk license tag recipients and payment of elk license tag fees by check, money order, or credit card authorization in the amount specified by subsection 702(b)(1)(L)(M), to the department's regional office nearest the proposed cooperative elk hunting area, by the first business day following August 1.
(c) An elk license tag issued pursuant to the provisions of this section is valid only during the general elk season in which the cooperative elk hunting area occurs and shall only be used on land specified in the landowner's application. License tags are not transferable.
(d) All provisions of the Fish and Game Code and Title 14, CCR, relating to the take of birds and mammals shall be conditions of all license tags issued pursuant to this section.
(e) Any permit issued pursuant to Section 555 may be canceled or suspended at any time by the commission for cause after notice and opportunity to be heard, or without a hearing upon conviction of a violation of this regulation by a court of competent jurisdiction.
Note: Authority cited: Section 1575, Fish and Game Code. Reference: Sections 67 and 1575, Fish and Game Code.

Appendix 20. Modification to Existing Regulations

Change	Proposed Tag Range	2015 Tag Quota	Proposed Season	2015 Season Dates	Change in # of days
Establish new San Emigdio Mountain tule elk hunt	0-15 bull 0-40 antlerless	N/A	Oct. 8 - 21	N/A	N/A
Establish new Camp Roberts tule elk hunt	0-10 bull 0-20 antlerless in 3 periods	N/A	**Period 1** Sept 17 - Oct 3 **Period 2** Nov. 12 - 27 **Period 3** Dec. 17- Jan 1	N/A	N/A
Split Mendocino tule elk hunt - establish 5 zones (North Coast)	0-10 bull 0-40 antlerless	4 bull 4 antlerless in total for all Mendocino	**bull** Aug. 10-19 **Antlerless** Nov. 5-14	Sept. 23 - Oct. 4	-2
Middle Fork	0-10 bull 0-40 antlerless	N/A	**bull** Aug. 10-19 **Antlerless** Nov. 5-14	Sept. 23 - Oct. 4	-2
Upper Russian	0-10 bull 0-40 antlerless	N/A	**bull** Aug. 10-19 **Antlerless** Nov. 5-14	Sept. 23 - Oct. 4	-2
Little Lake	0-5 bull 0-10 antlerless	N/A	**bull** Aug. 10-19 **Antlerless** Nov. 5-14	Sept. 23 - Oct. 4	-2
South Coast	0-5 bull 0-10 antlerless	N/A	**bull** Aug. 10-19 **Antlerless** Nov. 5-14	Sept. 23 - Oct. 4	-2
Split Independence tule elk hunt- establish Goodale tule elk hunt	0-10 bull 0-10 antlerless in five periods	5 bull	No change	N/A	N/A
Split Northwestern Roosevelt elk hunt -establish Del Norte and Humboldt County Roosevelt elk hunts	N/A	N/A	N/A	N/A	N/A
Modify tag ranges and season dates for Northwestern (Proposed Del Norte and Humboldt) Roosevelt elk hunt	**Del Norte** 0-15 bull 0-25 antlerless 0-10 either-sex in 5 periods **Humboldt** 0-20 bull 0-50 antlerless 0-10 either-sex in 5 periods	45 either-sex	Sept. 1-20 Oct. 1-20 Nov. 1-20 Dec. 1-20 Jan. 1-20 Sept. 1-20 Oct. 1-20 Nov. 1-20 Dec. 1-20 Jan. 1-20	Sept 2. - 24	78
Split Marble Mountain Roosevelt elk hunt - establish Marble Mountain South and Marble Mountain North Roosevelt elk hunts.	N/A	N/A	N/A	N/A	N/A

Modify tag ranges and season dates for the Marble Mountain (proposed Marble Mountain North and South) Roosevelt elk hunt.	**Archery/ Muzzle loader** 0-20 either-sex **Period 1** 0-50 bull 0-20 antlerless **Period 2** 0-10 bull 0-40 antlerless **Period 3** 0-5 bull 0-15 antlerless for both Marble Mountain North and South	5 **Arch/Muzzleloader** either-sex **General Season** 35 bull 10 antlerless	**Arch/Muzz** Aug. 31 - Sept. 8 **Period 1** Sept 10-21 **Period 2** Sept. 24 -Oct. 5 **Period 3** Nov. 2-17 for both Marble Mountain North and South	**Arch/Muzz** Oct. 31-Nov. 8 **General Season** Sept. 9-20	19
Modify tag ranges and season dates for Northeastern Rocky Mountain elk hunts	**Archery** 0-10 bull, 0-10 antlerless, & 0-20 either-sex **Gen. Method** 0-30 bull 0-20 antlerless	**Archery** 10 either-sex. **General Method** 15 bull 10 antlerless	**Archery** Aug. 31-Sept. 11 **General Method** bull Sept. 19-30 antlerless Nov. 12-23	**Archery** Sept. 2-13 **General Methods** Sept. 16-27	12
Modify Fort Hunter Liggett tule elk hunt boundaries - Change name to Fort Hunter Liggett Central Coast	N/A	N/A	N/A	N/A	N/A
Modify season tag ranges and season dates for Fort Hunter Liggett tule elk hunts.	**Public and Military Apprentice** 0-4 bull 0-16 antlerless **Archery** 0-20 either-sex 0-20 antlerless **Muzzleloader** 0-12 bull 0-20 antlerless **General Method Per.** 1 0-14 bull 0-32 antlerless **Per. 2** 0-16 bull 0-30 antlerless **Per. 3** 0-28 bull 0-14 antlerless **Military Only early season** 0-2 bull 0-2 antlerless	**Public and Military Apprentice** 2 bull 2 antlerless **Archery** 4 either-sex 8 antlerless **Muzzleloader** 0 bull 0 antlerless **General Method Per. 1** 0 bull 8 antlerless **Per. 2** 0 bull 8 antlerless **Per. 3** 8 bull 0 antlerless **Military Only early season** 2 bull 1 antlerless	**Public and Military Apprentice** Dec. 17-Jan. 1 **Archery either-sex** July 27 Aug. 4 **antlerless** Sept. 28-Oct. 6 **Muzzleloader** Oct. 8-19 **General Method Per.** 1 Nov. 3-11 **Per. 2** Nov. 22-30 **Per. 3** Dec. 17-Jan. 1 **Military Only early season** Aug 17-21 & Aug 24-28	**Public and Military Apprentice** Dec. 19-Jan. 1 **Archery either-sex** July 29 Aug. 6 **antlerless** Sept. 30-Oct. 8 **Muzzleloader** Oct. 10-21 **General Method Per.** 1 Nov. 3-11 **Per. 2** Nov. 22-30 **Per. 3** Dec. 19-Jan. 1 **Military Only early season** Aug 8-12 & Aug 22-26	0 2 0
Modify Grizzly Island tule elk hunt boundaries	N/A	N/A	N/A	N/A	N/A

Modify tag ranges and season dates for Grizzly Island tule elk hunts.	**13 General Periods** 0-3 bull 0-12 antlerless 0-10 spike in each period **Apprentice** 0-4 antlerless 0-4 spike in first four periods	**General Method** **Per 1.** 5 antlerless 4 spike **Per. 2** 8 antlerless 3 spike **Per. 3** 8 antlerless 2 spike **Per. 4** 2 bull 8 antlerless **Per. 5** 2 bull 8 antlerless 2 spike **Apprentice** **Per 1.** 3 antlerless 1 spike **Per. 2** 2 spike	**General Method Per. 1** Aug. 16-19 **Per. 2** Aug. 18-21 **Per. 3** Aug. 23-26 **Per. 4** Aug 25-28 **Per. 5** Aug. 30-Sept. 3 **Per. 6** Sept. 1-4 **Per. 7** Sept. 6-9 **Per. 8** Sept. 8-11 **Per. 9** Sept. 13-16 **Per. 10** Sept. 15-18 **Per. 11** Sept. 20-23 **Per. 12** Sept. 22-25 **Per. 13** Sept. 27-30 **Apprentice** **Per. 1** Aug. 16-19 **Per. 2** Aug. 18-21 **Per. 3** Aug. 23-26 **Per. 4** Aug 25-28	**General Method** **Per. 1 antlerless** Aug. 11-14 **spike** Aug. 13-16 **Per. 2 antlerless** Aug. 18-21 **spike** Aug. 20-23 **Per. 3 antlerless** Aug. 25-28 **spike** Sept. 10-13 **Per. 4 antlerless** Sept. 8-11 **bull** Sept. 10-13 **Per. 5 antlerless** Sept. 15-18 **bull** Sept. 17-20 **spike** Sept. 17-20 **Apprentice** **Per 1. Antlerless** Aug. 11-14 **spike** Aug. 13-16 **Per. 2 spike** Aug. 20-23	8
Modify La Panza tule elk zone boundaries	N/A	N/A	N/A	N/A	N/A
Modify tag ranges for La Panza tule elk hunts.	**Period 1** 0-20 bull 0-30 antlerless **Period 2** 0-20 bull 0-30 antlerless **Apprentice** 0-2 bull 0-2 antlerless	**Period 1** 6 bull 5 antlerless **Period 2** 6 bull 6 antlerless **Apprentice** **Per. 1** 1 antlerless	N/A	N/A	N/A
Modify tag ranges and season dates for Lake Pillsbury tule elk hunt.	0-10 bull 0-10 antlerless for 3 periods	2 bull 4 antlerless	**Per. 1** Sept. 26-Oct. 5 **Per. 2** Oct. 12-21 **Per. 3** Oct. 26-Nov 4	**antlerless** Sept. 9-18 **bull** Sept. 28-Oct. 7	10
Modify San Luis Reservoir tule elk hunt tag ranges and season dates	0-10 bull 0-20 antlerless 0-10 either-sex	5 either-sex	**Period 1** Oct. 1-23 **Period 2** Nov. 12-23 **Period 3** Dec. 17-28	Oct. 3-25	24
Modify Bear Valley tule elk hunt tag ranges	0-10 antlerless 0-10 bull	2 antlerless 3 bull	No change	Oct. 10-18	N/A
Modify Santa Clara tule elk tag ranges	0-15 bull 0-20 antlerless	0	No change	Oct. 10-25	N/A
Modify Alameda tule elk tag ranges	0-4 bull 0-10 antlerless	0	No Change	Oct. 10-25	N/A

Modify season dates for the Multi-zone fund raising elk tag	1 bull	1 bull	Aug. 13-Nov. 10	Varied by hunt area. Opened 7 days prior to earliest season for each zone	Varies from 25 to 71
Modify Siskiyou tag ranges and season dates	**Period 1** 0-40 bull 0-40 antlerless **Period 2** 0-10 bull 0-40 antlerless **Period 3** 0-5 bull 0-20 antlerless **Archery/ Muzzleloade**r 0-20 either-sex	20 bull 20 antlerless	**Period 1** Sept. 12-21 **Period 2** Sept. 24 - Oct. 5 **Period 3** Nov. 2-17 **Archery/ Muzzleloade**r Aug. 31-Sept. 8	Sept. 9-20	37
SHARE Elk	Correspond to tag ranges in identified zones	Correspond to tag ranges in identified zones. 3 bull 3 antlerless issued	No change	Between Aug. 15-Jan 31. Seasons are assigned to properties	0

Appendix 21. Impacts of Proposed Regulation Modification

	Impacts of Hunting Elk						
	Impacts on the gene pool	**Impacts on social structure**	**Effects on habitat**	**Effects on Recreational Opportunities**	**Effects on other wildlife species**	**Effects on economics**	**Effects on public safety**
Establish new San Emigdio Mountain tule elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Establish new Camp Roberts tule elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Mendocino tule elk hunt - establish 5 zones	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Independence tule elk hunt- establish Goodale tule elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Northwestern Roosevelt elk hunt - establish Del Norte and Humboldt County Roosevelt elk hunts	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Northwestern (Proposed Del Norte and Humboldt) Roosevelt elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Marble Mountain Roosevelt elk hunt - establish Marble Mountain South and Marble Mountain North Roosevelt elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for the Marble Mountain (proposed Marble Mountain North and South) Roosevelt elk hunt.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Northeastern Rocky Mountain elk hunts	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Fort Hunter Liggett tule elk hunt boundaries - Change name to Fort Hunter Liggett Central Coast	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify season tag ranges and season dates for Fort Hunter Liggett tule elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Grizzly Island tule elk hunt boundaries	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

Modify tag ranges and season dates for Grizzly Island tule elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify La Panza tule elk zone boundaries	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges for La Panza tule elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Lake Pillsbury tule elk hunt.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify San Luis Reservoir tule elk hunt tag ranges and season dates	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Bear Valley tule elk hunt tag ranges	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Santa Clara tule elk tag ranges	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Alameda tule elk tag ranges	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify season dates for the Multi-zone fund raising elk tag	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Siskiyou tag ranges and season dates	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
SHARE Elk	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

	Impacts of Hunting Elk				
	Growth-Inducing impacts	**Short-term uses and long term productivity**	**Significant irreversible environmental changes**	**Welfare of Individual animal**	**Cumulative Impacts**
Establish new San Emigdio Mountain tule elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Establish new Camp Roberts tule elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Mendocino tule elk hunt - establish 5 zones	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Independence tule elk hunt- establish Goodale tule elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Northwestern Roosevelt elk hunt - establish Del Norte and Humboldt County Roosevelt elk hunts	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Northwestern (Proposed Del Norte and Humboldt) Roosevelt elk hunt	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Split Marble Mountain Roosevelt elk hunt - establish Marble Mountain South and Marble Mountain North Roosevelt elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for the Marble Mountain (proposed Marble Mountain North and South) Roosevelt elk hunt.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Northeastern Rocky Mountain elk hunts	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Fort Hunter Liggett tule elk hunt boundaries - Change name to Fort Hunter Liggett Central Coast	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify season tag ranges and season dates for Fort Hunter Liggett tule elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Grizzly Island tule elk hunt boundaries	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Grizzly Island tule elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify La Panza tule elk zone boundaries	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges for La Panza tule elk hunts.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify tag ranges and season dates for Lake Pillsbury tule elk hunt.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify San Luis Reservoir tule elk hunt tag ranges and season dates	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Bear Valley tule elk hunt tag ranges	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Santa Clara tule elk tag ranges	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Alameda tule elk tag ranges	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify season dates for the Multi-zone fund raising elk tag	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Modify Siskiyou tag ranges and season dates	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
SHARE Elk	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant