



ELK CONSERVATION AND MANAGEMENT PLAN

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FROM OUR DIRECTOR



It is remarkable that in a state with nearly 40 million people, one of the largest, most iconic land mammals in North America is one of our most successful conservation stories. Elk, or Wapiti, meaning “ghost kings” as named by the Shawnee Indians due to the animals’ elusive behavior are coming back from a precipitous population decline. The Department of Fish and Wildlife is proud to present this adaptive, scientifically based management plan that considers the many challenges facing elk in the most populous state in the nation.

We’ve come a long way. In 1870, there were three tule elk left in California. Three. Through the efforts of the Department of Fish and Wildlife, hunters, conservation organizations and Tribes, the three sub-species of elk in California have rebounded to approximately 12,900 animals today. California now supports approximately 5,700 Roosevelt elk, 1,500 Rocky Mountain elk and 5,700 tule elk.

For ages, elk have played a significant role in the lives of our predecessors. Elk are depicted in thousand-year-old petroglyphs and have played spiritual roles in many societies. The goal of this management plan is to maintain, restore and enhance sustainable elk populations into the future. Through this plan, the Department of Fish and Wildlife will advance strategies for recreational use, establish goals for coordination with other governmental agencies, Tribes and the public, and develop methods to alleviate resource conflicts.

Our goal is more than just recovery of a single species. Given future threats such as climate change and ongoing habitat loss – we must learn how to preserve biodiversity on a scale that protects entire ecosystems as well as the species that live within those systems. A lot has changed since more than 500,000 elk freely roamed the state, and we must use the best science available to help guide management actions. A lot is at stake if we don’t act collectively. All Californians benefit when we have healthy and accessible fish and wildlife. We invite you to join us in our quest to advance this vision for elk conservation.

Charlton H. Bonham

Director, California Department of Fish and Wildlife



EXECUTIVE SUMMARY

There are four subspecies of elk in North America. Three occur in California, one of which, the tule elk, is only found here. Prior to non-indigenous settlement, it is estimated the elk population in California was more than 500,000 animals. Elk inhabited most parts of central and northern California extending into Oregon. During this time, indigenous people managed and utilized elk for food, clothing and tools. Non-indigenous settlement decimated California's elk populations. By 1872, only a few tule elk remained in the San Joaquin Valley. With the financial support of hunter tag fees, the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act – excise tax on sporting arms and ammunition) the Department of Fish and Wildlife (Department), conservation organizations and hunters were able to restore elk to the landscape across California. Through the conservation of suitable, connected habitats and active management including translocation, elk populations have rebounded and are now extending their range into previously occupied areas and beyond. Elk population growth since 1970 has been significant and California now supports approximately 5,700 Roosevelt elk, 1,500 Rocky Mountain elk and 5,700 tule elk.

Elk populations are recovering but will never reach historic levels due to permanent loss of habitat. Maintaining positive trends, in light of an increasing human population, will require minimizing loss of currently occupied habitat to development or conversion to other land uses. Conflicts have arisen with expanding human and elk populations, which have become significant in some areas. Loss or damage to property, public safety, and public health concerns caused the California State Legislature to act. In 2003, Fish and Game Code Section (§) 3952 was adopted and requires the Department to develop a statewide approach for management of elk. Fish and Game Code §1801 is the Department's Conservation of Wildlife Resources Policy, to encourage preservation, conservation and maintenance of wildlife resources under the jurisdiction and influence of the state. This section also provides objectives for the policy that include:



- Providing for the beneficial use and enjoyment of wildlife
 - Perpetuating all species for their intrinsic value
 - Providing aesthetic, educational and non-appropriative uses
 - To maintain diversified recreational uses
 - To provide economic contributions
 - To alleviate economic losses
- Characteristics and geographic range of each elk subspecies within the state, including Roosevelt elk, Rocky Mountain elk, and tule elk
 - Habitat conditions and trends within the state
 - Major factors affecting elk within the state, including, but not limited to, conflicts with other land uses
 - Management activities necessary to achieve the goals of the plan and to alleviate property damage
 - Identification of high priority areas for elk management
 - Methods for determining population viability and the minimum population level needed to sustain local herds
 - Description of the necessary contents for individual herd management plans prepared for high priority areas

Fish and Game Code §1802 gives the Department jurisdiction over the conservation, protection and management of fish, wildlife and native plants, and the habitat necessary for biologically sustainable populations of those species. Fish and Game Code §3952 directs the Department to develop a state-wide elk management plan, consistent with the Conservation of Wildlife Resources Policy, and maintain sufficient elk populations in perpetuity, while considering the following:





The Department is committed to developing and maintaining an effective, positive and cooperative relationship with California federally recognized Tribes (Tribes) regarding elk management. The Department and Tribes share authority to regulate the take of elk, with Tribes having authority on tribal lands and the Department over the remainder of the state. In order to achieve the goals regarding California's elk populations, innovative management actions and collaboration will be required, and guidance from a statewide elk management plan (management plan) is necessary to help mediate competing and conflicting interests. This elk management plan is designed to address these goals and objectives and assure the conservation, protection, restoration, enhancement and reestablishment

of California's elk populations and habitat. This is critical to providing cultural, scientific, educational, recreational, aesthetic and economic benefits for present and future generations of Californians.

The management plan describes historical and current geographic range, habitat conditions and trends, and major factors affecting Roosevelt, Rocky Mountain and tule elk in California. It identifies, delimits and describes high priority areas for elk management, referred to as Elk Management Units (EMUs) and establishes broad conservation and management objectives. The 22 EMUs collectively comprise the current known distribution of elk in California with few exceptions. The EMU plans are living documents with objectives focused on priori-

ty actions within a geographic area and are subject to change by the Department as additional information is gathered.

These plans can be updated independent of the main plan and other individual EMUs. Documents specific to each EMU (see Appendix E) contain information for high priority areas under the following headings: Description of EMU, Elk Distribution and Abundance, Management Goals, Objectives and Actions, Herd Viability, Summary of Annual Harvests, Unit Highlights, and Unit Specific Research. The management plan also considers methods of assessing elk population viability. The Department is committed to funding and staffing actions to achieve the goals of the EMUs.

Management activities to achieve plan goals generally emphasize maintaining and improving habitat conditions on public and private land. EMU documents identify specific management objectives and actions, along with who is responsible for those objectives and actions. Where it is (or may become) necessary to alleviate property damage and public health and safety problems within an EMU, regulated hunting is the recommended primary method of population control, followed by capture and translocation of surplus animals as resources allow when regulated hunting is infeasible or ineffective.

A draft management plan was made available for public review from November 28, 2017 to January 29, 2018. The Department received over 200 comments on the draft during the comment period. The Department edited the draft based on public input, and then received additional independent scientific peer review from wildlife agencies of four other states (Colorado, Oregon, Utah and Washington) prior to finalizing the draft.

This conservation and management plan provides guidance and direction to help set priorities statewide. The plan establishes general policies, goals and objectives, on a statewide scale. Individual EMU documents address issues specific to the unit and establish population objectives and future management direction.

Although the Department has statutory authority and primary responsibility for wildlife management in California, partnerships with other organizations and agencies have assisted with elk management in the past and will be increasingly important in the future. This plan emphasizes that sharing of resources and collaboration with all parties interested in elk conservation and management will be essential to managing California's elk populations into the future.



I. INTRODUCTION

As the trustee agency for the state's fish and wildlife resources, the California Department of Fish and Wildlife (Department) is responsible for the conservation, protection and management of biologically sustainable populations of elk (*Cervus canadensis*) as provided in Section 1802 of the Fish and Game Code (FGC §1802). This conservation and management plan (management plan) provides strategic guidance to manage Roosevelt elk (*C. c. roosevelti*), Rocky Mountain elk (*C. c. nelsoni*) and tule elk (*C. c. nannodes*) consistent with California's Conservation of Wildlife Resources Policy, FGC §1801. The policy emphasizes the following objectives:

- Providing for the beneficial use and enjoyment of wildlife
- Perpetuating all species for their intrinsic value
- Providing aesthetic, educational and, non-appropriative uses
- To maintain diversified recreational uses
- To provide economic contributions
- To alleviate economic losses.

Elk are California's largest land mammal and an important wildlife resource whose population growth in recent decades has been of great interest to the public. Elk also are popular with the hunting public, and from 2011-2017 the Department received an annual average of 34,394 tag applications for approximately 330 elk tags per year through the Big Game Drawing. Current elk range encompasses approximately 25% (25,171,496 acres) of California (Figure 1). While elk do not occupy the entire geographic area in these range maps, the maps attempt to identify the general distribution of elk.

By 1870, tule elk numbered as few as three animals and Roosevelt elk had also declined (Barnes 1925a

1925b, Harper et al. 1967, McCullough 1969, Meredith et al. 2007). Through the efforts of the Department, conservation partners, and hunters, elk have rebounded to approximately 12,900 animals today and growing (Figure 2). Big game tag fees, Federal Wildlife Restoration funds (known as the Pittman-Robertson Act or "PR" funds), and conservation partners, such as the Rocky Mountain Elk Foundation (RMEF), provide financial and other resources to support these efforts. RMEF has contributed over \$5.3 million for elk and elk habitat recovery in California, including habitat enhancement and restoration, conservation easements, translocations and scientific research.

California's human population (approximately 39 million) is larger than any other state in the nation (U.S. Census Bureau 2012). This poses challenges for wildlife conservation efforts and exacerbates environmental stresses (e.g., land development, urbanization, changes in land management practices, fire suppression, climate change and invasive species) affecting elk populations. Because of increasing conflicts between elk and humans, legislation adopted in 2003 added FGC §3952 and required the Department to prepare a statewide elk management plan consistent with California's Conservation of Wildlife Resources Policy. Although a statewide tule elk management plan was written in 1979 and the Department has since prepared individual management plans for designated "high priority" tule elk herds, California lacked a comprehensive statewide plan to guide management of all elk subspecies. In part, the need for a statewide plan was supplanted by the development of annual environmental documents and updates related to hunting, which ensured a growing and manageable strategy for elk in California.

Estimated Elk Distribution and Land Ownership, 2017

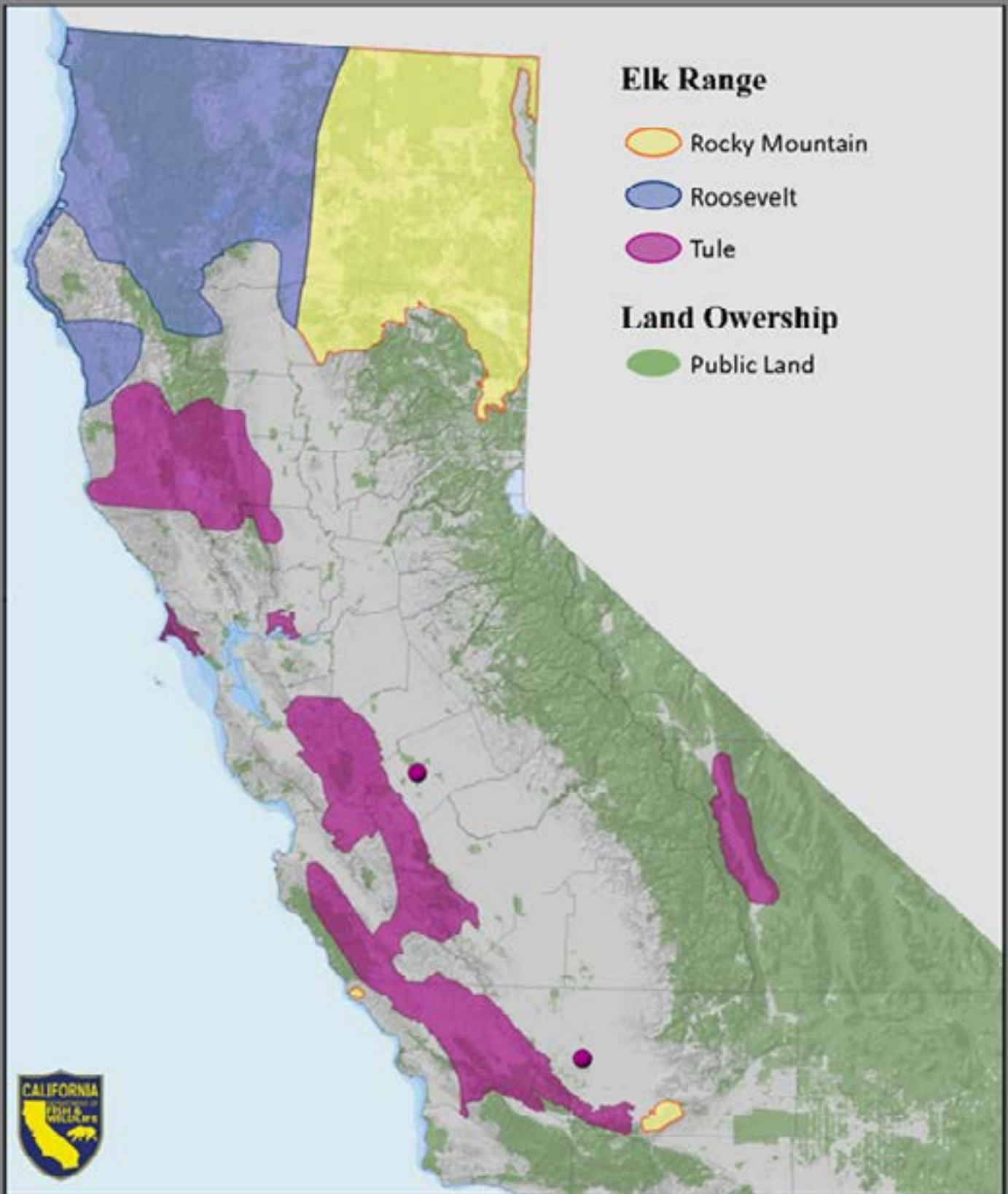


Figure 1. Estimated elk distribution in California and land ownership, 2017.

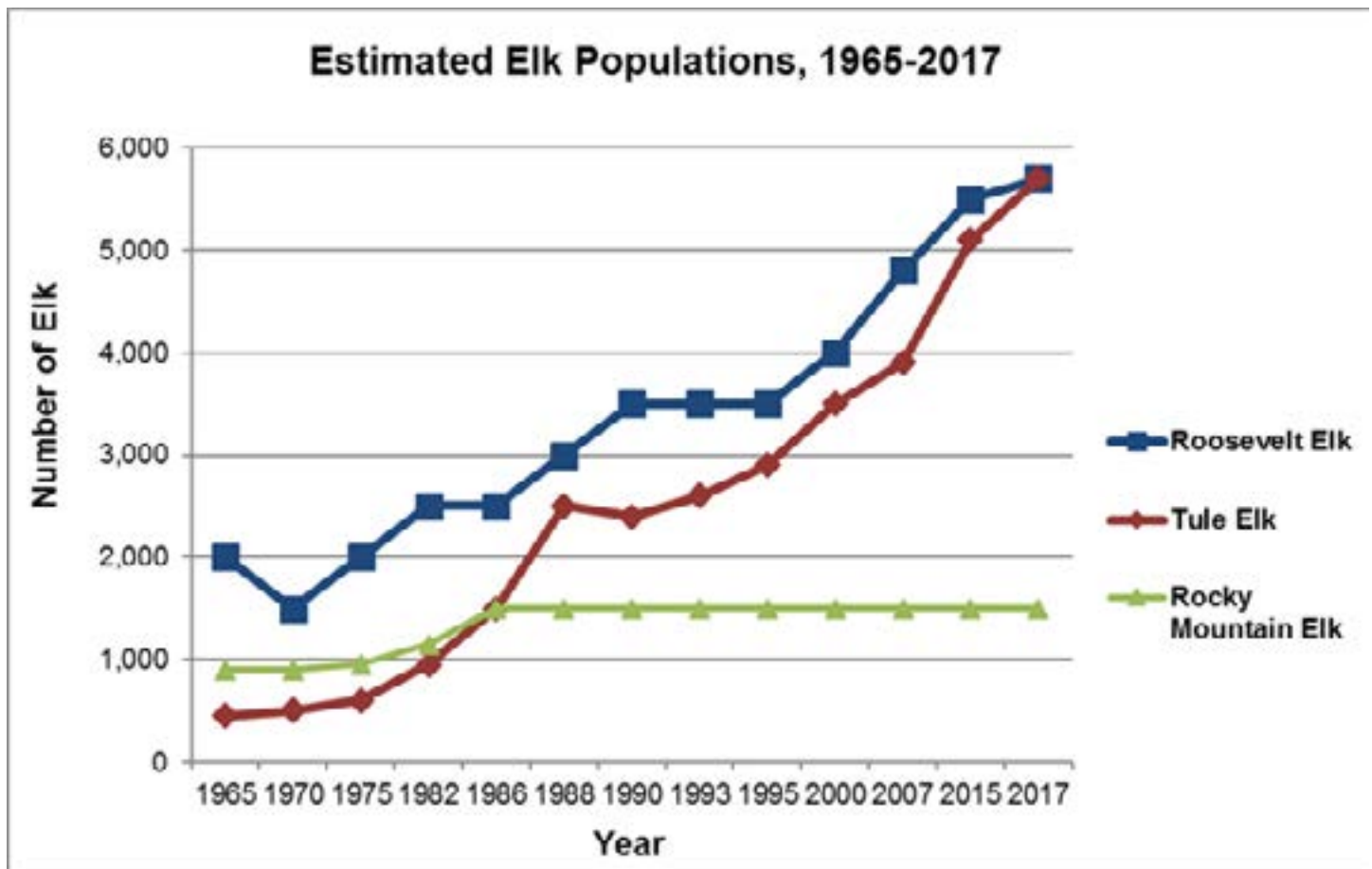


Figure 2. Estimated elk populations in California, 1965-2017.

Based on the Conservation of Wildlife Resources Policy and the specific requirements in FGC §3952, a nine-person working group reviewed elk management plans from other states and Canadian provinces and provided initial recommendations to develop California's elk management plan. The working group consisted of three members from the Department, two representatives from the Rocky Mountain Elk Foundation, and one each from the United States Department of Agriculture Forest Service (USFS), United States Department of Interior Bureau of Land Management (BLM), California Cattlemen's Association, and California Farm Bureau Federation. The working group met three times in 2005 and 2006. The recommendations of the working group provided an early foundation for the Department's development of an elk management plan based on

available information and expertise about California's elk and their habitats. Beginning in 2016, the Department began working with California federally recognized Tribes (Tribes) for input to address tribal concerns.

The management plan describes historical and current geographic range, habitat conditions and trends, and major factors affecting elk in California. It identifies 22 high priority areas for elk management, referred to as Elk Management Units (EMUs; these are delimited and described in Appendix E). The EMUs comprise the current known distribution of elk in California (however, elk are expanding their range and sightings periodically occur outside the EMU boundaries). The EMU plans are living documents subject to change by the Department as

additional information is gathered and updated independent of the main plan and other individual EMUs.

Consistent with other species management plans, EMU plans contain specific information for each high priority area, organized under the following headings: Description of EMU, Elk Distribution and Abundance, Management Goals, Objectives and Actions, Herd Viability, Summary of Annual Harvests, Unit Highlights and Unit Specific Research. The statewide management plan discusses methods of assessing population viability. The Department is committed to funding and staffing actions to achieve the goals of the EMU plans.

The Department recognizes that some of its proposed activities and species management plans may adversely affect the interests of California Tribes. The Department is committed to consulting with Tribes on fish, wildlife and plant issues, and assessing and avoiding to the extent possible adverse impacts of Department activities on tribal interests. The Department and Tribes share authority to regulate the take of elk as they move across the landscape and jurisdictional boundaries. The Department possesses regulatory authority within state boundaries and Tribes possess regulatory authority within tribal land. A Tribe maintains inherent power to regulate the take of elk by its members within its reservation. (*New Mexico v. Mescalero Apache Tribe* (1983) 462 U.S. 324, 332, 335). Application of the FGC to a Tribe and its members within that Tribe's reservation is limited (FGC §12300).

The Department may not enforce its elk regulations against tribal members within their Tribe's reservation when doing so is preempted by federal law or would infringe on the right of self-government. Moreover, the Department is committed to providing meaningful opportunities to participate in decision-making processes that affect tribal interests. It is important to acknowledge tribal interests and needs separately from public interests and needs. The Department and Tribes may share similar goals of enhancing elk populations as an integral part of California's ecosystems, but have different management strategies.

A. Goals and Objectives

Effective conservation and management of elk requires reliable information on population size, density, age structure, fecundity (birth rates), mortality (death rates), sex ratio, and their use of habitats throughout the year and over time. This plan establishes a framework for an ongoing monitoring program to evaluate elk populations and habitat conditions. Monitoring population trends and the details of habitat use and distribution will help the Department understand how elk use the landscape and interact with other wildlife species. The goals and objectives identified in this plan and its provisions for information gathering and monitoring will help the Department maintain, restore, and enhance sustainable elk populations into the future. It will allow the Department to modernize strategies for recreational use, establish goals for coordination with governmental agencies, Tribes and the public, and develop methods to alleviate resource conflicts.

A list of plan goals, including the objectives to achieve those goals, is summarized in Table 1.

Table 1. Overall Elk Management Plan Goals and Objectives.

GOALS/OBJECTIVES	COMPLETE BY
GOAL 1: In consideration of current habitat capacity, other land uses, and long term environmental changes, improve elk habitat conditions and population levels.	
Objective 1.1: Continue/complete projects to estimate population abundance, distribution, habitat use, and demographics to provide managers with additional information to make adaptive management decisions.	2023
Objective 1.2: Increase elk populations by at least 10% statewide where human-elk conflicts are expected to be minimal.	2028
Objective 1.3: Improve the quality/quantity of elk habitats by at least 5%.	2028
Objective 1.4: Determine the genetic diversity and areas of hybridization within EMUs, and identify EMUs that may benefit from translocations and habitat connectivity projects.	2023
Objective 1.5: Monitor elk populations for disease and parasites to identify potential health concerns and areas requiring management actions.	On-going
GOAL 2: Establish a positive, cooperative relationship with Tribes regarding elk management in recognition that the Department and Tribes share authority to regulate take as elk move across jurisdictional boundaries.	
Objective 2.1: Develop co-management agreements, memoranda of agreement, or similar mechanisms with Tribes for the management of elk within each appropriate EMU.	2021
Objective 2.2: The Department will work with Tribes to initiate at least five monitoring and/or habitat projects that will assist in guiding management decisions.	2025
GOAL 3: Enhance opportunities for the public to use and enjoy elk (e.g. hunting and wildlife viewing).	
Objective 3.1: Increase elk hunting opportunities by at least 10% where feasible and compatible with EMU population objectives.	2023
Objective 3.2: The Department will work with other agencies and non-governmental organizations to install 12 elk interpretative signs.	2023
Objective 3.3: The Department will conduct four workshops to inform the public about elk and elk viewing opportunities.	2023
GOAL 4: Alleviate human-elk conflicts and elk depredation complaints.	
Objective 4.1: Reduce incidents of human-elk conflicts on private property by at least 25%.	2023
Objective 4.2: Identify and map areas of high human-elk conflict; assess potential for alleviating damage by reducing localized elk populations through regulated hunting, where feasible.	On-going



B. Taxonomy and Historical Distribution

As elk populated North America during the Pleistocene epoch, they radiated into six distinct subspecies (Polziehn et al. 1998). Recovered specimens have helped scientists map the probable route taken by these highly mobile ungulates as they colonized western North America through northeastern California (Figure 3). Evolutionary forces and isolation presumably gave rise to Roosevelt elk and tule elk (McCullough 1969).

California is unique in supporting three subspecies of elk; Roosevelt, Rocky Mountain, and tule elk. Historically, Roosevelt elk occupied the Cascade and North Coast mountain ranges extending south to near San Francisco (Harper et al. 1967, Quayle and Brunt 2003), and eastward, at least to Mount Shasta (Murie 1951). Rocky Mountain elk have inhabited portions of northeastern California for at least 100 years (McCullough 1969), and tule elk were distributed throughout the Central Valley and the grasslands and woodlands of central California's Coast Range (McCullough 1969).

Figure 4 depicts the estimated historical distribution of elk in California. Prior to European arrival, approximately 42% (42.7 million acres) of California's land base supported elk, where they were abundant (Murie 1951). While a reliable statewide population estimate prior to European settlement is unavailable, McCullough (1969) considered 500,000 tule elk a reasonable estimate.

The decline of elk in California generally correlated with their demise in other states and provinces throughout North America (Bryant and Maser 1982), where the Eastern (*C. c. canadensis*) and Merriam (*C. c. merriami*) subspecies became extinct in the eastern and southwestern portions of the continent. The decline of California elk is well-documented (Evermann 1915, Doney et al. 1916, Barnes 1925a 1925b, Ellsworth 1930, Dow 1934, Graf 1955, Harper et al. 1967, McCullough 1969, Tule Elk Interagency Task Force 1979, Fowler 1985, Koch 1987) and summarized in Appendix F. Non-indigenous human settle-

Spread of Elk in Western North America

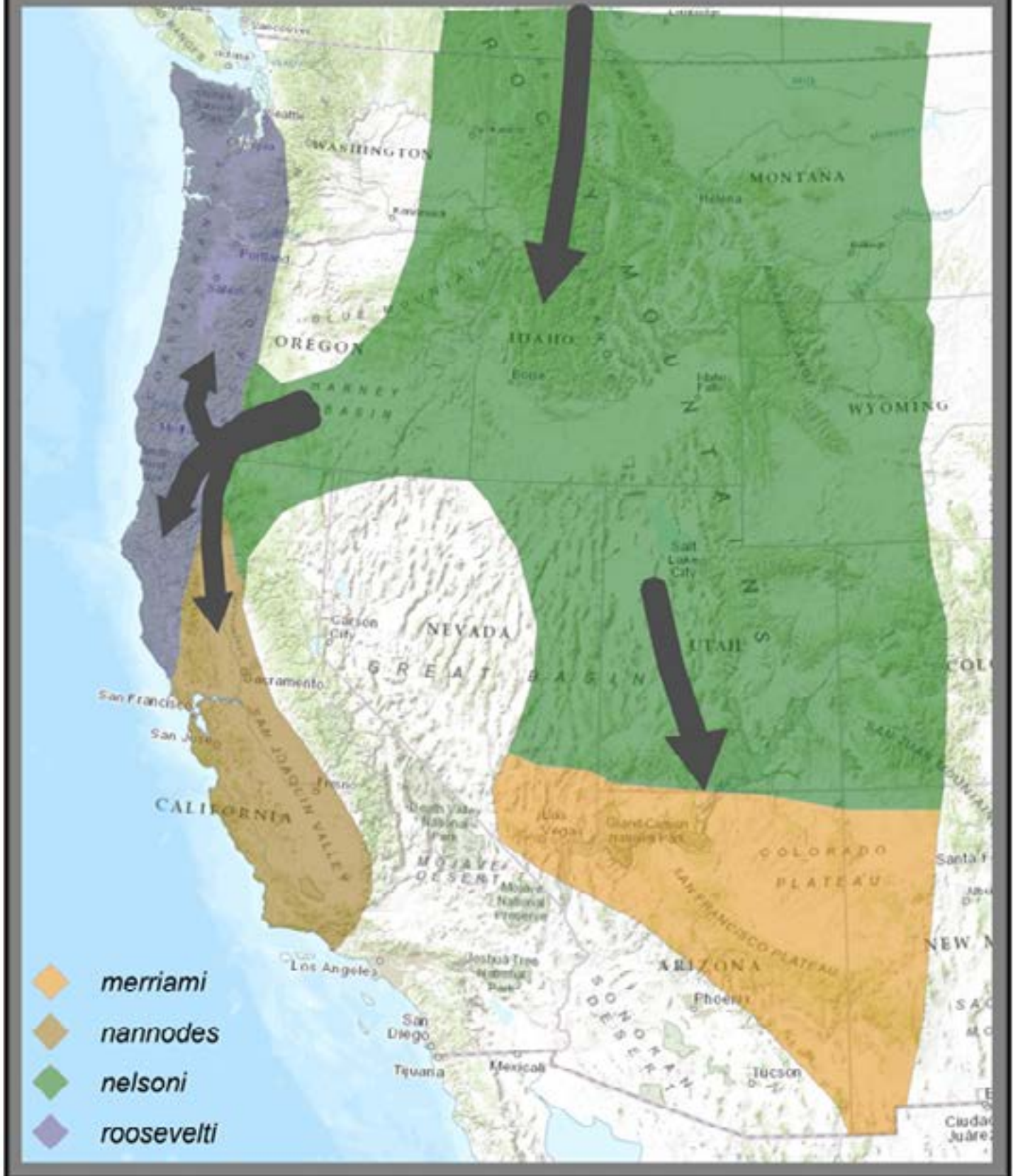


Figure 3. Hypothesized dispersal of elk through western North America (McCullough 1969).

Estimated Historical Elk Distribution

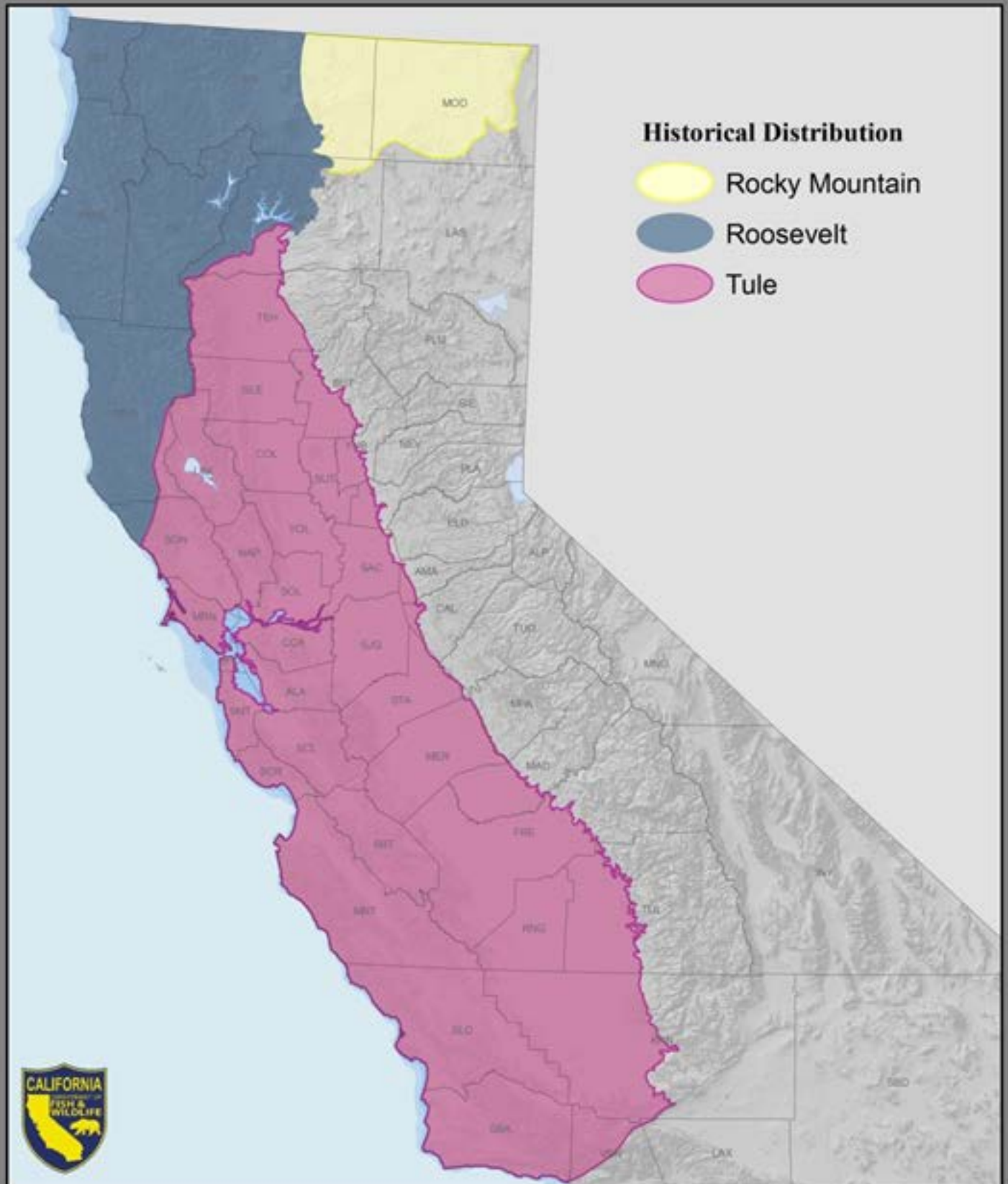


Figure 4. Estimated historical elk distribution in California adapted from Murie 1951, Harper et al. 1967, and McCullough 1969

ment decimated elk. Specific adverse activities included market shooting for the fur/hide, tallow and meat trades; introduction of exotic plants (particularly annual grasses) along with feral/domesticated cattle and horses; and the onset of the gold rush era (Harper et al. 1967, McCullough 1969). Tule elk were reduced to only a few animals by 1874 (McCullough 1969, McCullough et al. 1996, Meredith et al. 2007).

The native status of the Rocky Mountain elk subspecies in California is a disputed topic, and their historical range is difficult to establish with certainty. Two museum specimens of skulls and antlers collected from northeastern California are similar to those of Rocky Mountain elk (McCullough 1969), suggesting that when Europeans arrived, this subspecies was present where conditions were favorable. However, Murie (1951) and Bryant and Maser (1982) speculated that the Great Basin and the Sierra Nevada and Cascade ranges served as a western barrier to the dispersal of Rocky Mountain elk. Murie (1951) cited historical accounts of elk in Nevada, although densities were likely never great and their distributions disjunct. Thus, the Great Basin was not a complete barrier to Rocky Mountain elk and they occupied areas where habitats were most suitable. Because the historical presence of Rocky Mountain elk in California is poorly documented, the Department has in the past reported they were not native to California (Dasmann 1975, Curtis 1982, California Department of Fish and Game 1990).

Recent research confirms that Rocky Mountain and Roosevelt elk occupy the same range and interbreed in a portion of northeastern California (Meredith et al. 2007). However, genetic characteristics of present-day Rocky Mountain elk in this region have been confounded by translocations of this subspecies to northeastern California from Montana in the early 1900s. Murie (1951), Harper et al. (1967), and

McCullough (1969) included portions of Shasta, Siskiyou and Modoc counties within historical elk range, however there appears to be disagreement regarding subspecies classification. The presence of elk in northeastern California during the European expansion is substantiated in the writings of early American explorers and the ethnographic accounts of the Modoc and Pit River Indians (Kniffen 1928, Bruff 1949, Ray 1963, Miller 1977). While the phylogenetic relationship of elk in the region remains an academic question, it is clear that elk were native and inhabited northeastern California when Europeans arrived.

C. Life History and Habitat

Life History - The elk is the second largest member of the deer family (Cervidae) in North America (Wisdom and Cook 2000). There is great variation in body size depending on the subspecies, geographic location, habitat and nutrition (Geist 1998, O'Gara 2002, Peek 2003). Males, females and young are referred to as bulls, cows, and calves, respectively. Elk form herds (groups) throughout much of the year (Peek 2003). Bull groups are not as cohesive as cow groups, with individuals departing and returning to the group over time (Franklin and Lieb 1979). Bulls generally segregate from cows and calves in late-spring through the summer antler growing period, rejoin cows and calves during early fall, and then form large combined groups in winter or early spring (de Vos et al. 1967, Bender and Haufler 1999, Peek 2003).

The rut, or breeding season, begins as early as August and can extend into November. The rut for tule elk can continue later in the season in much warmer temperatures compared to other elk (Van Wormer 1969). After the rut, mature bulls can become reclusive or form groups with other bulls (de Vos et al. 1967, McCullough 1969). In mid-May until early

June, cows seek solitude for calving in areas with hiding cover (tall grass or brush) (Skovlin et al. 2002). At this time, yearlings may be aggressively driven away by the cows (de Vos et al. 1967, Irwin 2002). Single calves (rarely twins) are born after a gestation period of 244 to 265 days; weight at birth is approximately 35 pounds (Hudson et al. 1991, Haigh 1998, Wisdom and Cook 2000, Hudson and Haigh 2002, Peek 2003).

Elk are opportunistic feeders and will eat a variety of plant species when forage is available (Kufeld 1973, Peek 2003). They are classified as intermediate or mixed feeders and can switch from consuming primarily grasses to entirely browse (i.e. tender shoots or twigs of shrubs and trees) (Cook 2002, Peek 2003). As summer progresses, elk consume more forbs and woody browse, while in fall the diet switches to mainly dry grasses and browse (Jenkins and Starkey 1991, Cook 2002, Beck and Peek 2005). During winter, elk seek a mixture of grasses, forbs and shrubs to ensure proper intake of nitrogen (Kufeld 1973, Peek 2003). Forage utilization varies significantly between subspecies, habitat types, sex, and geographic locations (Kufeld 1973, Thomas and Toweill 1982, Cook 2002, Bliss and Weckerly 2016).

Elk are fairly long lived, with harvest-reported ages in California up to 19 years for Roosevelt elk, 14 years for Rocky Mountain elk, and 18 years for tule elk (California Department of Fish and Wildlife, unpublished data). Elk herds in California have continued to expand through natural dispersal, translocations, and Department management efforts. These expansions occurred with limited state regulated hunting and harvest by Tribes and their members on tribal lands. Cause-specific mortality outside of regulated hunting has not been studied in California's elk. Illegal killing of elk by both commercial and non-commercial poachers in California has been

implicated as a source of mortality (Hansen 1994). Elk poaching incidents have been recorded in several of California's herds. Hanson and Willison (1983) reported that poaching was found to be the cause of a complete failure of one tule elk translocation at Fort Hunter Liggett in Monterey County when nearly all the animals were poached. Another high profile poaching incident occurred in 2013 when three tule elk bulls were shot and abandoned near Los Banos in Merced County prompting the California Deer Association to offer a reward for information related to the killings (Romans 2013). The Department devotes considerable resources to investigate poaching events. However, neither legal nor illegal killing of elk are considered to be limiting factors on established elk herds because the herds continue to expand or remain stable (California Department of Fish and Wildlife, unpublished data; also see Figure 2). Other human-related mortalities include vehicle collisions and entanglement in fences and other structures. Very few diseases and parasites have been documented in California elk and they are not thought to be limiting factors for California elk (California Department of Fish and Wildlife, unpublished data).

Throughout their North American range, elk are susceptible to predation by numerous carnivores including black bear (*Ursus americanus*), coyote (*Canis latrans*), gray wolf (*C. lupus*), grizzly bear (*U. arctos*), and mountain lion (*Puma concolor*) (Barber et al. 2005, Zager et al. 2007, White et al. 2010, Yellowstone National Park (YNP) 2014). Gray wolf and mountain lion are the main predators in California capable of killing a healthy adult elk (Zager et al. 2007, White et al. 2010). In YNP, grizzly and black bear are efficient predators of elk calves while coyote, wolf, and mountain lion will also occasionally kill calves (Griffin et al. 2011, Yellowstone National Park 2014). An ongoing study in Idaho revealed

higher than expected predation of calves by black bears (Barber et al. 2005, White et al. 2010). Black bears have been observed stalking and killing elk calves in Mendocino and Siskiyou counties (S. Koller and R. Schaefer, California Department of Fish and Wildlife, personal communication, 2015). The overall impact from black bear, coyote and mountain lion predation on elk in California is not fully known and predation rates on elk likely vary among herds. No information exists on the specific impact to elk from the gray wolf in California because the gray wolf has only recently re-entered and resided in California. Consequently, predation information from other states is all that is currently available. A Conservation Plan for Gray Wolves in California evaluates potential impacts from predation on elk based on information in other studies, but actual impacts are not known and will most likely vary for individual herds of elk (Kovacs et al. 2016).

Habitat — The following narrative is a general description of elk habitat conditions in North America, with an emphasis on conditions and trends within California. Elk habitat consists of varying types of forest cover and large open areas (Cook 2002). Forest habitat provides escape cover from various types of human disturbance and natural predators, and forest corridors provide pathways among seasonal habitats (Cook 2002, Hudson and Haigh 2002, Peek 2003). Open areas provide forage in the form of grasses and forbs (Cook 2002). Some Roosevelt and Rocky Mountain elk herds migrate from one area to another according to season and weather conditions (Wisdom and Cook 2000, Beck and Peek 2005). Adequate winter habitat in the form of lowland forest cover is important for elk survival. Preserving and managing forests and open areas with elk in mind can assist land agencies and private landowners in supporting elk populations (Cook 2002, Peek 2003). Tule elk find suitable foraging and protective

cover in coastal and inland regions of central California. Some of these areas lack trees (e.g., Carrizo Plain area of San Luis Obispo County), and elk appear to use topographic relief for escape (California Department of Fish and Wildlife, unpublished data). Due to the lack of severe weather patterns (no deep snow) in these regions, tule elk do not seasonally migrate (McCullough 1969, Thomas and Toweill 1982, California Department of Fish and Wildlife, unpublished data).

Elk habitat conditions in California are diverse and vary within each of the seven provinces as identified in the 2015 State Wildlife Action Plan (California Department of Fish and Wildlife 2015). Elk within California occupy numerous habitat types, including coastal coniferous rainforests, coastal prairies, emergent wetlands, grasslands, hardwood forests, juniper, mixed-conifer forests, oak woodlands, shrublands, and sagebrush (Harper et al. 1967, McCullough 1969, Franklin and Lieb 1979, Happe et al. 1990, California Department of Fish and Wildlife, unpublished data).

Much of the elk habitat in California (over 9 million acres) is public land administered by the USFS and management of those lands has changed dramatically over time. From the gold rush days until the mid-1900s, fire regimes, logging and livestock grazing significantly altered California's vegetation communities by converting vast acreages to earlier successional vegetation (Gruell 2001). After the mid-1900s, changing forest management practices resulted in a decrease of early successional vegetation on federal lands (Lutz et al. 2003). Much of this is due to improved efficiency in fire suppression leading to increased tree densities and a decline in shrub species. Many of the shrubs that are present are mature, and the young, more nutritious, shrubs that benefit elk and deer are less abundant (Kucera

and Mayer 1999, Schaefer et al. 2003). As early as the 1970s, the USFS began to recognize that fire suppression resulted in fuel buildup in the forests, and a new regime of managing rather than controlling fires was started (Gruell 2001). This strategy recognizes the ecological role of fire in increasing forest heterogeneity, but is not yet universally embraced (North et al. 2009).

Timber harvest also altered California's vegetation communities by producing, early seral vegetation in forested habitats to the benefit of elk and deer. However, data from the California State Board of Equalization (CSBOE) in 2014 demonstrate a reduction in timber harvest volume through time on both public and private land (Figure 5). The rate of decrease has been much greater on public than on private land. Between 1978 and 1988 there was 1.4 times greater

volume (board feet) of timber removed from private than public lands. In contrast, between 2003 and 2013 the volume increased to 8.3 times the volume removed from public lands (CSBOE 2014). Timber harvest methods, such as type of harvest (clear cut versus selective) and pre- and post-harvest treatment types (such as herbicide application) also can affect early seral vegetation and habitat quality.

The BLM administers approximately 1.8 million acres of elk habitat in California. Due to a history of fire suppression and excessive livestock grazing, many shrublands have become senescent and cannot supply the nutrition for ungulates found in early successional stage habitats (Gruell 1996). Increased fuel load in aging shrublands supports high intensity fires that typically convert remaining shrublands to vegetation communities dominated by non-na-

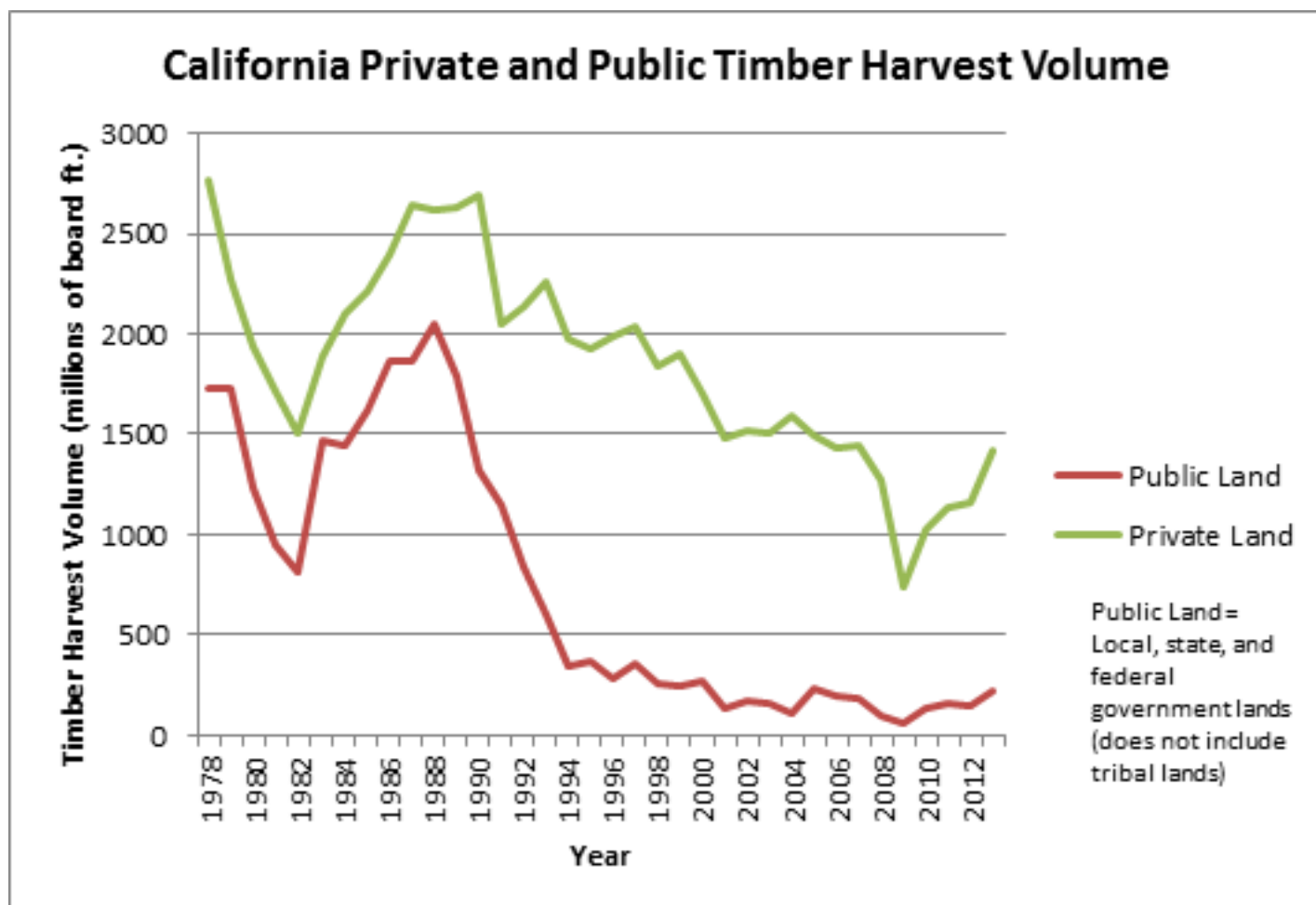


Figure 5. Timber harvested from public and private forests in California from 1978 to 2013 (CSBOE 2014).

tive annual grasses of little nutritional value during certain times of the year, such as cheatgrass (*Bromus tectorum*). Overall, cheatgrass is considered a negative for rangelands but does have nutritional value during the winter and spring period for deer and elk (Bishop et al. 2001). Additionally, in the Great Basin region of California, vegetation communities continue to be threatened by the encroachment of western juniper (*Juniperus occidentalis*) into sagebrush-grasslands (Schaefer et al. 2003, Bureau of Land Management 2007). Juniper encroachment into sagebrush and bitterbrush habitats has further reduced habitat quality for ungulates by competing with more desirable forage species (Schaefer et al. 2003, Cox et al. 2009).

Thus, fire suppression, timber harvest and livestock grazing have altered habitat in California. To the extent they have produced early seral vegetation in forested habitats, these activities have been beneficial to deer and elk. Deer population levels in California have declined over time (i.e. the last 50 years), whereas elk populations have gradually increased. Since carrying capacity is difficult to determine over large areas of diverse habitat types, the maximum elk population size within the various provinces of California is unknown. It is likely that additional early successional habitat would result in higher elk populations.

Current forage conditions on most elk ranges in California are the result of forest and range management, and livestock grazing practices of the public land management agencies (USFS, BLM, and other public agencies) and private landowners. Although the Department does not manage activities on these lands, it does provide input to the public land management agencies and private timber lands through review of timber harvest plans. The Department directly manages only a small fraction of land

within current elk range. The Department owns six properties where elk land management activities occur: Grizzly Island Wildlife Area in Solano County, San Antonio Valley Ecological Reserve in Santa Clara County, Cache Creek Wildlife Area in Lake County, North Coast Wildlife Area Complex in Del Norte and Humboldt counties, and Carrizo Plains Ecological Reserve in San Luis Obispo County, and undesignated mitigation land (the future North Carrizo Ecological Reserve) in San Luis Obispo County. Management activities include controlling invasive weeds, installing water sources, conducting research, and planting food plots.

D. Distribution and Population Status Since 1970

Efforts during the early 1900s to translocate elk in California were sporadic and generally met with limited success (McCullough 1969, Dasmann 1975). By 1970, elk in California occupied less than 10% of their historic range (Figure 6); their distribution and abundance had declined precipitously during the latter part of the 1800s and remained so for decades.

Tule Elk — By 1970, isolated tule elk herds existed in the Owens Valley (Inyo County), at Cache Creek (Colusa and Lake counties), and within an enclosure in Kern County (McCullough 1969). State and federal legislation in the 1970s (i.e., Behr Bill [SB 722] 1971 and Public Law 94-389, 1976) focused specifically on reestablishing tule elk. The Behr Bill directed the Department to reestablish tule elk at suitable locations, whereas Public Law 94-389 required the secretaries of defense, agriculture, and the interior to cooperate with the state in making suitable federal lands reasonably available for elk. Subsequent to the state and federal legislation, more than 1,250 tule elk have been captured and moved to reestablish and augment herds at more than 20 locations in California. The Management Plan for the Conservation of Tule Elk (Tule Elk Interagency Task Force 1979) pro-

Estimated Elk Distribution 1970

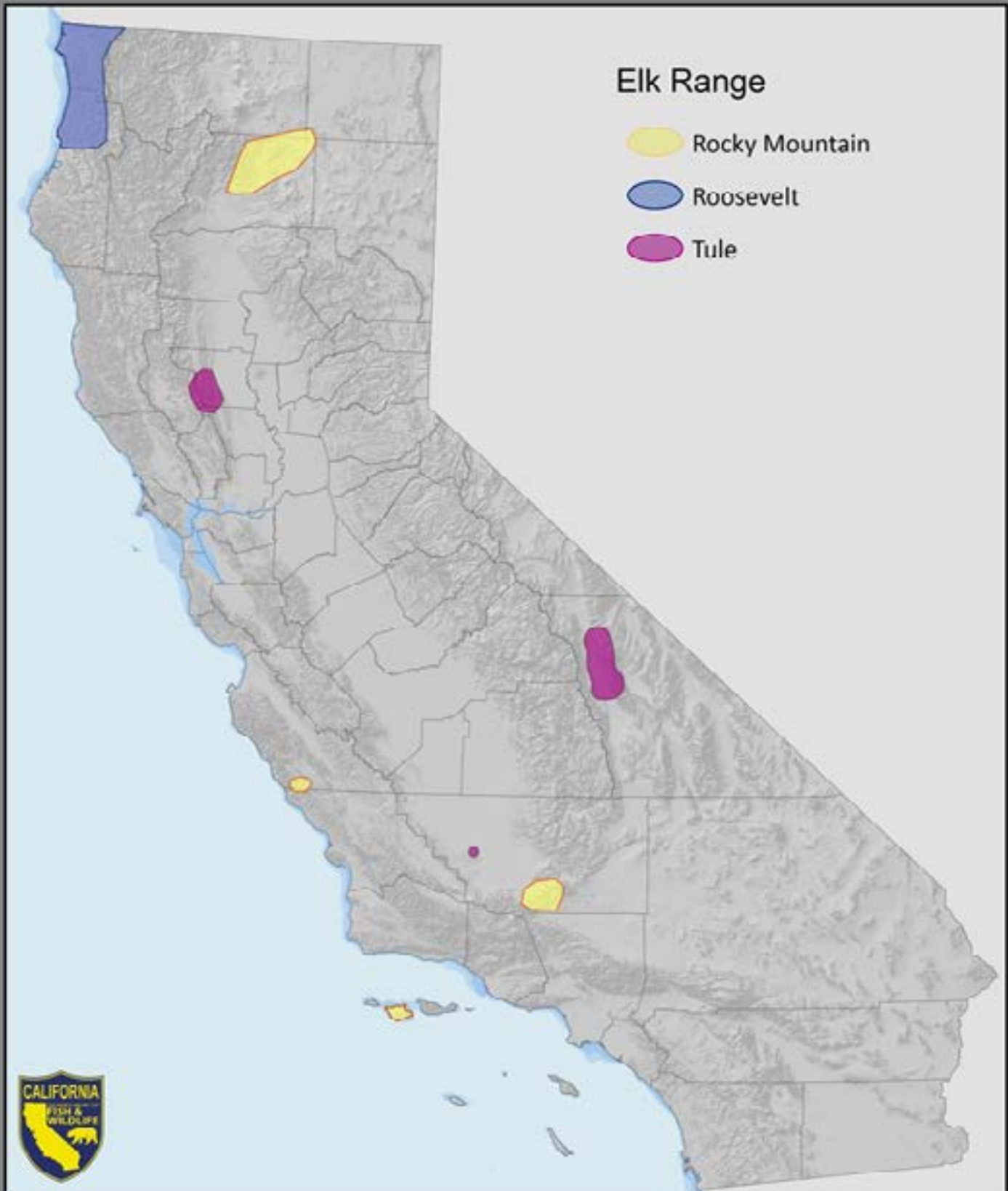


Figure 6. Estimated distribution of elk in California, 1970.

vided specific criteria for an area to be considered a suitable tule elk release site. These criteria (Appendix G) employ sound biological principles, and consider land use practices and the laws and regulations of the state. Details of specific capture and translocation efforts for each location appear in Appendix E.

Roosevelt Elk — The distribution of Roosevelt elk in 1970 focused on the Big Lagoon and Prairie Creek areas of Humboldt County, and to a lesser extent, a portion of Del Norte County (Harper et al. 1967; see Figure 6). In contrast to tule elk, Roosevelt elk translocation efforts were driven more by local interests than state or federal legislation. For example, from 1947 to 1965 the Department translocated 16 bulls and 35 cows from Prairie Creek to Bear Basin (Del Norte County), at least in part at the request of the Del Norte County Rod and Gun Club (O'Brien 1966). This effort initially was considered "moderately successful" (California Department of Fish and Game 1959), but later was determined to be unsuccessful (O'Brien 1966). Observations at the time by the Department area biologist suggests the translocated elk returned to the Prairie Creek area from the release site.

From 1982 to 1984, the Department translocated 24 Roosevelt elk from Redwood National Park (RNP) to the BLM King Range National Conservation Area (McCoy 1986). Elk are now re-established on public and private land near the King Range in southern Humboldt and northern Mendocino counties. In 1985, the Department began reintroducing Roosevelt elk from RNP to the Happy Camp area of Siskiyou County. This initially began as a cooperative effort between the Department, Klamath National Forest (KNF), and RNP. Later, the Oregon Department of Fish and Wildlife provided source stock from multiple sites in Oregon, so translocation efforts expanded to involve multiple release sites in Siskiyou and Trinity counties. From 1982 through 2000, more than 350 Roosevelt elk were translocated to reestablish populations in portions of southern Humboldt, Mendocino, Siskiyou and Trinity counties.

As Roosevelt elk herds grew in areas of northern California and Oregon and established at the translocation sites discussed above, they naturally dispersed to unoccupied habitat in several new northern California locations. For example, sightings of Roosevelt elk near Grass Lake in eastern Siskiyou County were



reported as early as 1965 (California Department of Fish and Game, unpublished data). Elk are now well established in the Grass Lake area, which is within the Siskiyou EMU.

Rocky Mountain Elk — Translocation of Rocky Mountain elk to California occurred on at least three occasions prior to 1970. In 1913, the Redding Elks Club purchased 50 Rocky Mountain elk from YNP for release in the Pit River area of Shasta County (Smith and Murphy 1973). The initial release apparently was augmented shortly thereafter by the accidental release of 24 elk from a stalled train in the Sacramento River Canyon (California Department of Fish and Game 1959). Additionally, a private effort to establish Rocky Mountain elk in Kern County occurred in 1967 with the release of 277 elk within a fenced enclosure on the Ellsworth Ranch. Rocky Mountain elk persist in parts of Shasta and Kern counties today.

In response to periodic Rocky Mountain elk sightings reported in Modoc County during the early 1990s, the Department used radio telemetry to monitor elk distribution and movement during 1993 and 1994 (Ratcliff 1994). Results of observations and surveys demonstrate that elk are established in the Northeastern California EMU and expanding their range into other parts of Modoc County along with portions of Lassen, Plumas, Shasta, Sierra and Siskiyou counties.

Current Distribution and Population Trends

The current distribution of elk in California (Figure 1) has expanded significantly and occupied range has increased by over 500% since 1970 (California Department of Fish and Wildlife, unpublished data). Successful translocation efforts contributed to this

range expansion. The expansion of tule elk range is especially significant; with intensive reintroduction efforts from the mid-1970s until 1998, when the most recent herd was established in the San Emigdio Mountains of Kern County. Additionally, successful reintroduction efforts from 1982 until 2000 contributed to expansion of Roosevelt elk range into portions of Siskiyou, Trinity, and southern Humboldt/northern Mendocino counties. The availability of suitable elk habitat and the ability of elk to disperse into those habitats also contributed to their range expansion in California. Rocky Mountain elk currently inhabit portions of northeastern California far from known release sites. Similarly, tule elk herds have become established more than 20 miles away from initial release sites. These include the Alameda (Alameda County), East Park Reservoir and portions of the Bear Valley (Colusa, Glenn and Lake counties), La Panza (San Luis Obispo County) and Owens Valley (Inyo County) herds. Elk occupy large and diverse geographic areas of the state and population densities vary by locality and habitat type. Most elk populations in California are slowly increasing (California Department of Fish and Wildlife, unpublished data). It must be noted that elk are absent from large areas within current elk range and it is likely that in many areas densities are at less than historical (i.e. pre-non-indigenous human) levels.

Figure 2 depicts increasing population trends for tule and Roosevelt elk in California since 1970. Currently there are approximately 5,700 tule elk throughout California in numerous herds, and Roosevelt elk in northern California are estimated at 5,700 individuals (California Department of Fish and Wildlife, unpublished data). There are four

Elk Management Units (EMU)



Figure 7. Elk Management Units.



known populations of Rocky Mountain elk totaling 1,500 animals in portions of Kern, Lassen, Monterey, Modoc, Plumas, San Luis Obispo, Shasta, Sierra and Siskiyou counties. Figure 2 depicts an unchanged population in Rocky Mountain elk (particularly since 1986); however, the Department lacks sufficient information regarding Rocky Mountain elk population size to make trend inferences.

Elk Management Units

Consistent with the requirements of FGC §3952 the Department has identified 22 geographic areas for elk management, referred to as Elk Management Units, as high priority areas (Figure 7). Individual EMU boundaries are based on current and potential distribution and generally correspond with existing elk hunt zone boundaries (in instances where public hunting zones have been established). Because elk are free ranging over large geographic areas, boundaries are generally expansive. Although EMU bound-

aries are based on current and potential distribution, future elk distribution may expand beyond established boundaries and additional EMUs may be established or existing boundaries updated as elk distribution changes.

Individual management documents have been prepared for each EMU depicted in Figure 7 (Appendix E). Each EMU document describes specific habitat types and vegetation characteristics, along with land use practices and recommendations for specific conservation and management activities. The documents identify area-specific needs and issues, including population monitoring, habitat conditions/trends, harvests, herd viability, land use conflicts, and recommended management actions. Within the EMU framework, the Department will work to understand habitat utilization, connectivity between habitats, and overall elk distribution across the landscape. Table 2 summarizes the goals and objectives for each EMU.

Table 2. Elk Management Unit Goals and Objectives. This table is subject to future revisions consistent with updates and/or changes made to the Elk Management Unit Plans

MANAGEMENT GOAL	MANAGEMENT OBJECTIVES*
In consideration of current habitat capacity, other land uses, and long term environmental changes, improve elk habitat conditions and population levels.	Continue/complete projects to estimate population abundance, distribution, habitat use, and demographics to provide managers with additional information to make adaptive management decisions
	Increase/maintain elk populations in areas where human-elk conflicts are expected to be minimal
	Enhance or increase elk habitats by at least 5%
	Implement a cause-specific mortality study and determine if identified factors are limiting population growth (e.g., predation/disease)
	Collaborate with Caltrans to provide information and recommendations to reduce vehicle collisions
	Identify the genetic diversity of the population and determine if individuals are hybridizing with other subspecies
	Determine the prevalence and significance of exotic lice on tule elk
	Determine habitat relationship between elk, livestock, and feral horses
	Maintain population within EMU objective and composition
Establish a positive, cooperative relationship with Tribes regarding elk management in recognition that the Department and Tribes share authority to regulate take as elk move across jurisdictional boundaries	Develop co-management agreements, memoranda of agreement, or similar mechanisms for the management of elk in cooperation with Tribes traditionally and culturally affiliated with the EMU
	Work with Tribes to complete monitoring and/or habitat projects that will assist in guiding management decisions or enhancing elk habitat
Enhance opportunities for the public to use and enjoy elk (e.g. hunting and wildlife viewing).	Increase/maintain/develop elk hunting opportunities where feasible and compatible with population objectives
	Work with other agencies and NGOs to install elk interpretive signs
	Conduct elk workshop to inform the public about elk and elk viewing opportunities
	Increase elk viewing and educational opportunities
	Provide information on the Department web page to inform the public about elk and elk viewing opportunities
Alleviate human-elk conflicts and elk depredation complaints	Reduce incidents of human-elk conflicts on private property by at least 25%
	Continue to monitor human-elk conflicts on private property
Reduce the number of confined herds and the frequency for removing excess animals	Eliminate one or more confined herds
	Reduce population levels within enclosures and identify preferred population control methods.
Enhance habitat within enclosures	Enhance elk habitats by at least 5%

*Individual EMUs contain detailed management objectives in addition to those identified in the overall goals and objectives in Table 1. Specific objectives within EMUs may be worded differently than the objectives listed here to account for differences within EMUs. NA - Not Applicable, OG - Ongoing

North Coast	Marble Mountains	Siskiyou	Northeastern	Mendocino Roosevelt	Mendocino Tule	Lake Pillsbury	Cache Creek/Bear Valley	East Park Reservoir	Grizzly Island	Alameda	Santa Clara/Mount Hamilton	Salinas/Fremont Peak	San Luis Reservoir	Central Coast	Hernandez Res./S. San Benito	La Panza	Fort Hunter Liggett	Camp Roberts	Owens Valley	San Emigdio Mountain	Tejon	Confined Herds
2023	2023	2023	2023	2023	2023	2024	2024	2024	OG	2023	2023	2024	2023	2023	2024	2023	2025	2023	2023	2023	2024	NA
2028	2028	2028	2028	2028	2028	2028	2028	2028	NA	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	OG	NA
2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	2028	NA
2023	2023	2023	2023	2025	2025	2025	2025	2025	NA	2023	2023	2024	2023	NA	2024	2024	NA	NA	NA	2025	NA	NA
2023	NA	2023	2023	2023	2023	NA	2023	NA	NA	NA	NA	NA	NA	NA	NA	2023	NA	NA	2023	NA	NA	NA
2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	NA
NA	NA	NA	NA	NA	NA	2025	NA	NA	NA	NA	NA	NA	2023	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	2028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	OG	NA
2021	2021	2021	2021	2021	2021	NA	2021	NA	NA	NA	NA	NA	NA	2021	NA	2021	NA	NA	2021	NA	NA	NA
2023	2023	2023	2023	2023	2023	NA	2023	NA	NA	NA	NA	NA	NA	NA	NA	2023	NA	NA	2023	NA	NA	NA
2023	2023	2023	2023	2023	2023	2023	2023	2023	2021	OG	OG	2023	2023	2025	2023	2023	OG	2020	OG	2022	2023	NA
2023	NA	NA	NA	NA	NA	2024	2024	2023	2024	2024	2024	NA	2023	NA	NA	2023	NA	NA	2023	NA	NA	NA
2023	NA	2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2023	NA	NA	2023	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2023
2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
2023	2023	2023	2023	NA	2023	NA	2023	2023	NA	NA	NA	2023	2023	2023	2023	2023	2025	2025	2023	NA	NA	NA
NA	NA	NA	NA	OG	NA	NA	NA	NA	NA	OG	OG	NA	NA	NA	NA	NA	NA	NA	NA	OG	OG	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2025
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2025
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2028

An EMU plan was not prepared for the Point Reyes National Seashore (PRNS) free-range herds. The Department is working cooperatively with PRNS staff as they develop a General Management Plan Amendment Environmental Impact Statement, which includes management of free ranging elk in the ranched areas on National Park Service lands. Once complete, an EMU plan will be developed for the PRNS free ranging elk herds. Updates to individual EMU plans will occur as additional data are collected and to reflect co-management agreements, memoranda of agreement, or similar mechanisms with Tribes affiliated with the EMU, private landowners, and land management agencies. An EMU document was prepared specific to three confined herds at Tupman Tule Elk State Reserve (Kern County), San Luis National Wildlife Refuge (Merced County), and PRNS at Tomales Point (Marin County).

E. Historical and Ongoing Management Efforts by the Department and California Tribes

Historical translocation efforts contributed to the recovery of elk populations in California. Other historical elk management activities included periodic regulated hunting prior to 1986, and consistent annual hunting beginning in 1986. Additional management efforts involved monitoring pathogens/parasites, distribution/movement, habitat use, food studies, population size, density, age structure, fecundity (birth rates), mortality (death rates), sex ratio, and genetic/Deoxyribonucleic Acid (DNA)/contraceptive analyses.

With the expansion of elk range in California since 1970, the need for surplus elk for additional reintroductions and further expansion has diminished. Much of the historical suitable habitat now supports elk, although most likely at densities less than those prior to non-indigenous settlement of the state in

many areas. However, an important management goal is to sustain or increase elk populations. Ongoing and future management efforts will likely involve translocation of surplus elk to improve the status of an existing population, maintain or increase genetic interchange between isolated populations and to recolonize elk to their historical ranges.

Direct protection of elk and highly regulated hunting have allowed elk populations to expand, leading to unwanted encounters with humans. This growth has resulted in depredation complaints and other conflicts on private property, and deterioration of habitat conditions and/or the physical condition of individual animals on public property. These conflicts are well documented with tule elk (McCullough 1969, Fowler 1985, Koch 1987), Roosevelt elk (California Department of Fish and Game 1959, Harper et al. 1967, California Department of Fish and Wildlife, unpublished data), and Rocky Mountain elk (California Department of Fish and Game 1959, California Department of Fish and Wildlife, unpublished data). Previous management efforts involved developing methods to alleviate or otherwise resolve depredation complaints, private property conflicts, and/or public safety incidents. As conflicts between expanding elk and human populations continue in California, these activities will likely become increasingly important. The Department will need to identify additional methods of alleviating conflicts as it balances the need to control population numbers with the directive to maintain elk populations in perpetuity.

California Tribes currently and historically managed elk habitat and hunted elk for food, materials, medicine and regalia. Elk play a prevalent cultural role in many Tribes both historically and to present day. Because of the holistic nature of many tribal cul-

tures, this connection is a reciprocation, integrating into the far reaches of ceremony and prayer. Many Tribes have traditional laws, oral traditions, and ceremonies that incorporate specific land management practices for elk, including seasonal application of prescribed fire to support elk habitat (early successional vegetation) and regulations of take based on seasonal ecological indicators and herd population dynamics. Historically, this reciprocation resulted in management of the landscape for the mutual benefit of tribal members and the elk population and held a steady place in their cultures.

Due to habitat loss and hunting for meat and hides, extirpation of nearly all elk from most tribal ancestral territories occurred as early as 1870. Due to various re-introduction efforts, elk have returned to many, but not all of these areas. Tribes remain interested in the re-introduction of elk to tribal lands within the historical range of elk. The Department will work with Tribes interested in establishing elk and those Tribes whose aboriginal territory may represent a source of elk for translocation. These activities may necessitate the development of additional EMUs for areas within historical elk range but outside of current EMU boundaries.

Elk are an important resource and an ecosystem management indicator for many Tribes. As part of current tribal management, Tribes have used prescribed burns to support elk habitat and accomplish vegetation and watershed management objectives. While achieving these objectives, Tribes have also considered the habitat needs of other culturally and legally protected species such as spotted owl (*Strix occidentalis*), California condor (*Gymnogyps californianus*), porcupine (*Erethizon dorsatum*), tan-oak (*Notholithocarpus densiflorus*) and salmon (*Oncorhynchus* species).

Activities such as reducing conifer encroachment in ridgeline meadows for summer habitat, increasing transitional dispersal corridors and wintering habitat along river bottoms serves multiple social, economic and ecological landscape values. In this context, elk fit into a strategic landscape-scale restoration effort that utilizes rotational seasonal burns at different elevation bands according to seasonal habitat needs of elk, such as forage, cover and calving (Sarna and Tucker 2016). The wide-ranging nature of elk coupled with a need to engage in consistent management that crosses jurisdictional boundaries makes co-management with Tribes necessary for effective elk management and persistent thriving elk populations throughout their historical range.

The need for funding elk inventory, monitoring, research and conservation activities will continue to increase. In 2011, Senate Bill 1058 became law (FGC §3953). This legislation mandated that all revenue from the sale of antelope, elk, deer, wild pig, bear and sheep tags, including fund-raising tags, be deposited into the Big Game Management Account (BGMA) to provide separate accountability for the receipt and expenditure of those funds. Permitted uses for these funds include acquiring land, completing projects, implementing programs to benefit big game, and expanding public hunting opportunities and related public outreach. Funds may also be used for administrative and enforcement costs of the programs and activities. In addition to revenue generated by big game tag sales, programs also apply for and receive PR funds. Prior to establishment of the BGMA, the elk program relied heavily on revenue from annual elk fund-raising hunt tags (which varied from year to year) and PR funds.