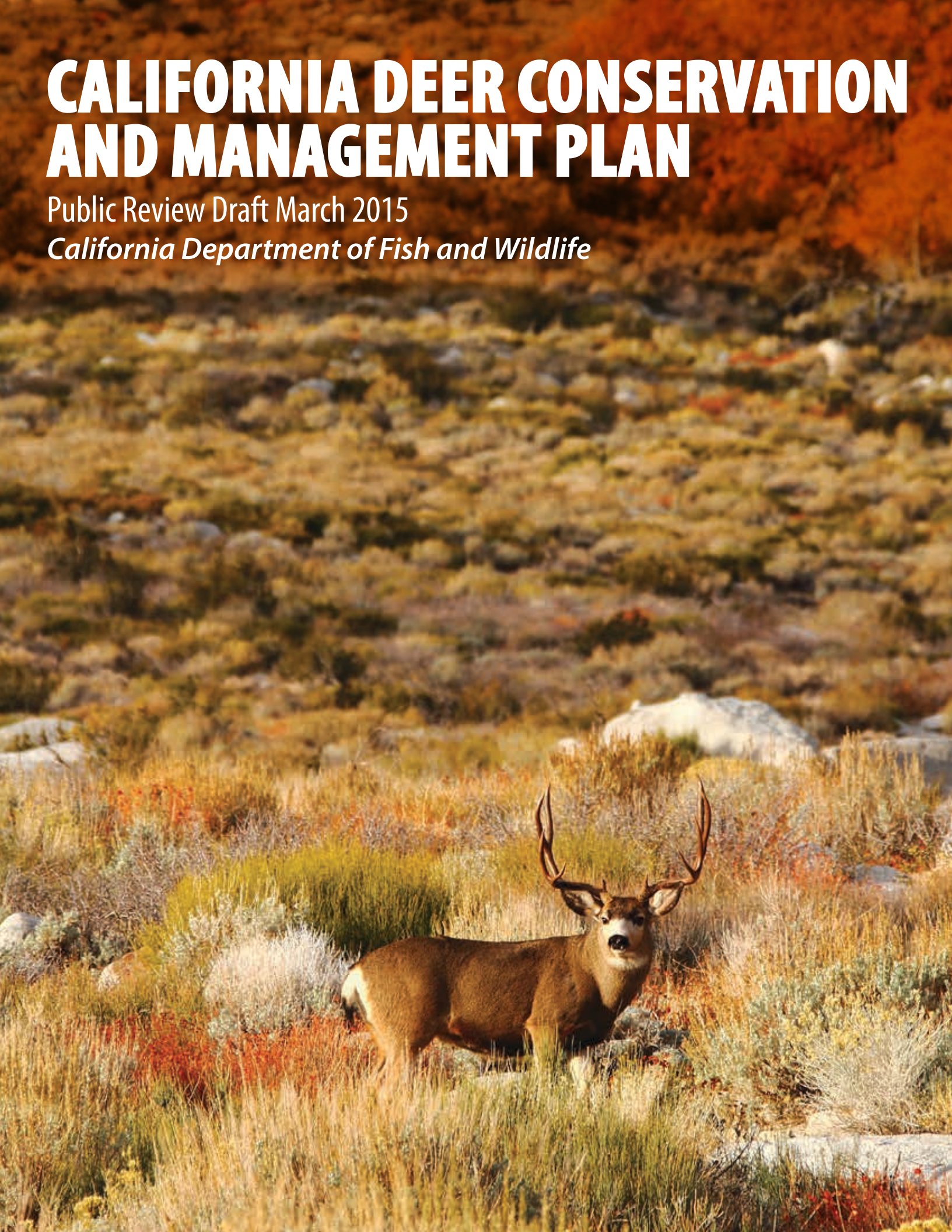
CALIFORNIA DEER CONSERVATION AND MANAGEMENT PLAN

Public Review Draft March 2015

California Department of Fish and Wildlife



CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Deer Conservation and Management Plan

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HOW TO PROVIDE COMMENTS ON THE PLAN

The Department is requesting public comments on the California Deer Management and Conservation Plan. Commenters may provide comments to the Department in one of two ways: electronic or U.S. Mail. Comments will be accepted until close of business April 30, 2015.

Send comments via U.S. Mail to Deer Plan, 1812 9th Street, Sacramento, CA 95811
Via electronic mail: DeerPlan@wildlife.ca.gov
Questions on how to comment on the plan may be directed to Stuart Itoga 916-445-3652.

Dedicated to our colleagues Kevin O'Connor, Clu Cotter, and Tom Stolberg who died in 2010 in a helicopter accident while conducting deer population surveys.

INTRODUCTION

The California Department of Fish and Wildlife (Department) is the trustee agency for the state's fish and wildlife resources, and as part of its trustee obligations, is responsible for the conservation and management of California's deer populations. To conserve and manage these populations, the Department must balance the needs of deer with the needs of a large and growing human population.

With a population of over 38 million people, California has more people than any state in the country (U.S. Census Bureau 2012). Mule and black-tailed deer (deer) are one of the state's most visible and widespread wildlife species. Deer occupy approximately 70 percent (70 million acres) of public and private lands in the State (Figure 1). The Department estimated the 2014 deer population to be approximately 443,289 individuals (Figure 2).

Deer are free-ranging animals and their habitat requirements sometimes result in conflicts with humans; conversely deer habitats may be negatively affected by human actions. Deer have historically been California's most popular game species, and their population decline in recent decades necessitates a new and updated strategy to conserve and manage the species using a new, adaptive approach to deer management. The California Deer Conservation and Management Plan (Plan) has been developed to inform and guide the decision making process regarding deer habitat and/or population management issues.

The last comprehensive, Department deer management plan was the 1976 "A Plan for California Deer" (CDFG 1976). This 1976 plan outlined the deer policy that was mandated by Assembly Bill 1521 (AB-1521,1977) and ultimately adopted by the Department and California Fish and Game Commission (Commission).

The Department's primary goal for the 1976 plan was to restore deer populations to the record high1960's levels and included habitat and population management goals for deer populations by "herd" units. Individual herd plans identified separate management objectives for each herd and 79 deer herd plans were completed and implemented by the mid-1980s. The herd units were based primarily on administrative boundaries (e.g., county lines, Department regional boundaries, and roads), deer behavior (migratory or resident), and subspecies (mule deer or black-tailed deer).

To the disappointment of many, it was realized by the early 1990's that the Department had limited capability to positively affect the quality of millions of acres of deer habitat in the state and obvious that we could not keep up with the rate at which that quality declined. Certainly, other factors such as development on winter range, highway mortality, predation, disease, and illegal harvest further impacted the ability to meet the 1976 plan goal. Changes in timber harvest and fire suppression methods have limited the availability of early seral plant communities that provide nutritious forage for deer (Wisdom et al. 1999). In addition, some studies indicate that climate change and invasive species are negatively impacting wildlife habitat (deVos et. al. 2007, Raymond et al. 2014, Fei et al. 2014). Additionally, since the early 1980s, habitat management in much of California's deer range has shifted toward a more comprehensive approach that focuses on either ecosystem conservation, or conservation of specific threatened and endangered species. Where a system supports a suite of wildlife species, the needs of one species may not be compatible with the needs of others. Conserving and managing for deer, and other early successional species, within a complex ecosystem will require balancing disturbance activities (such as fire, grazing, and logging) while maintaining diverse wetland/riparian, aspen, and late seral forest conditions in a combination that maintains appropriate levels of cover, forage, and water . Efforts to increase specific game species populations have changed and will continue to change to meet a broader ecosystem approach which considers the requirements of multiple wildlife species in the area under consideration.

In California the biggest stressor on deer populations has been the decline in quality and loss/conversion of deer habitat (Terborgh et al. 1999, Miller et al. 2001). Caughley 1994, Sih et al. 2000 and Fahrig 2003 reported that habitat loss is a major cause of extinction in wildlife populations. In retrospect, a combination of less habitat supporting deer, combined with other stressors impacting populations, restoring populations to the 1960's levels is an aspirational goal with a low likelihood of success.

For effective conservation and management, deer populations and habitats need to be monitored so that changes can be tracked over time and the data necessary for population modeling and recommending harvest strategies can be collected. Changes in habitat conditions result in shifts in habitat use over time. To determine how these changing conditions may be impacting deer, the Department needs to assess habitat conditions and populations. With a new understanding established, studies can be implemented to improve our knowledge of how they use the resources available to them and their relationships with other species such as predators. An effective deer conservation and management Plan must be based on robust population data and current habitat assessments (derived from the best available methods) and be consistent with current laws and environmental policies.

FIGURE 1.

Estimated Distribution of Deer in California based on wildlife habitats, 2014.

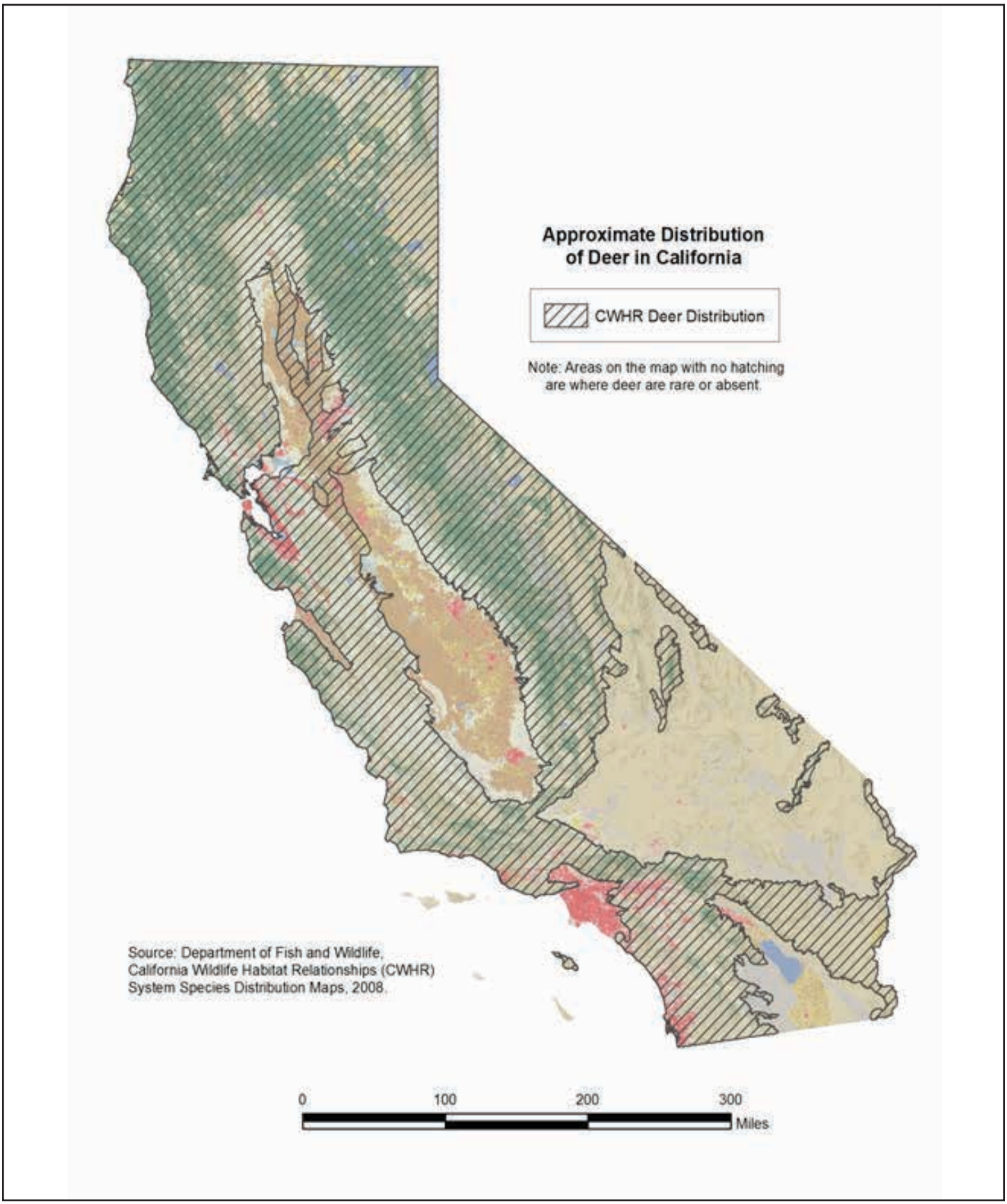
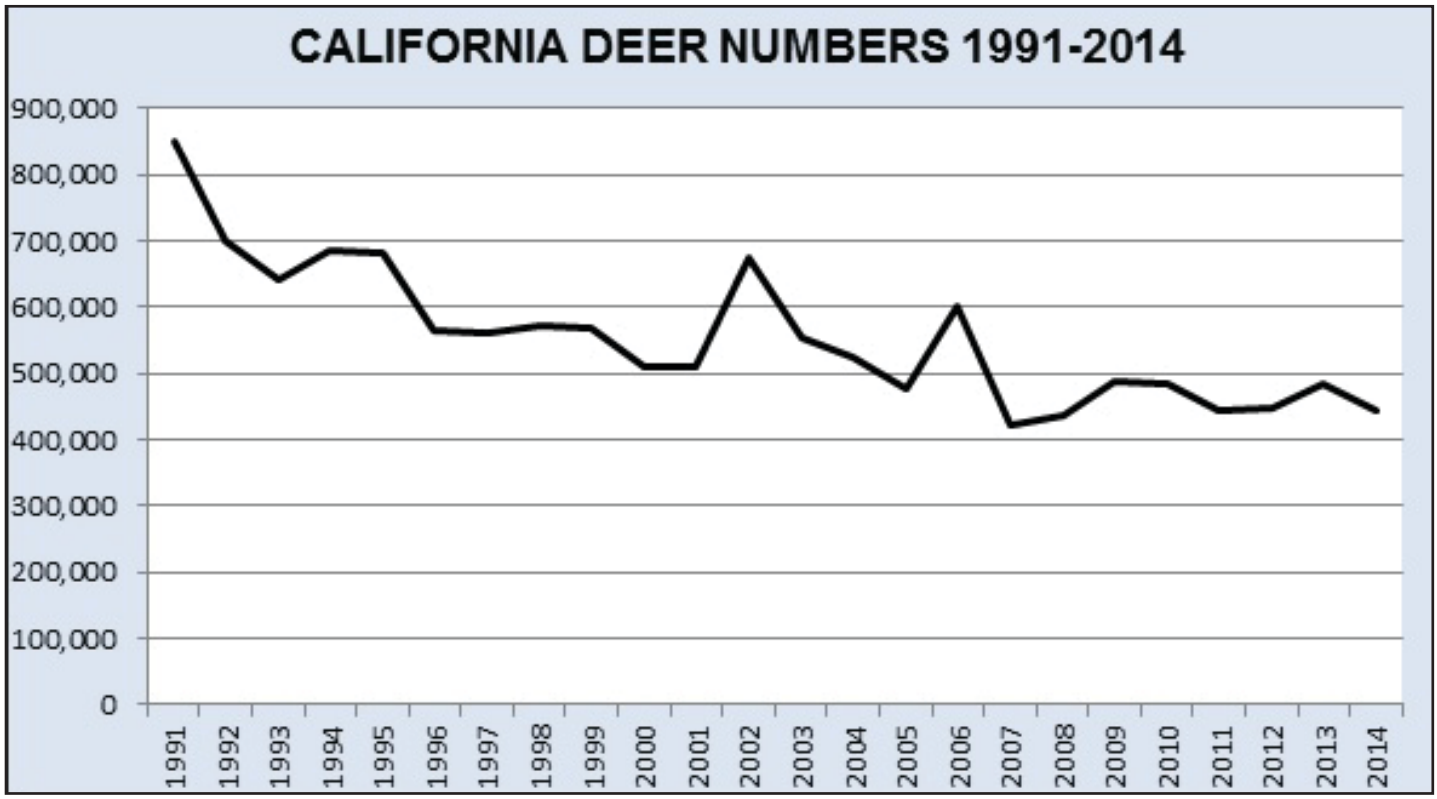


FIGURE 2.

Estimated deer population, 1990 - 2014.



Although the existing deer herd plans contain substantial information (e.g., demographics and recommendations for research, habitat work, and public use) they have proven insufficient at meeting the 1976 plan goals, likely because of the magnitude of landscape change needed, but also because of additional new landscape management priorities arising since the plans were prepared. Future conservation success for deer will require new and more robust deer population information, greater collaboration among the Department and public/private land management entities, greater support from the public, and perhaps greater incentive to restore significant acreages of early seral habitat into California's deer ranges.

This Plan has been prepared as an update to the 1976 plan and provides the framework for updating deer management based on areas called Deer Conservation Units (DCU) (Figure 3). This landscape level approach to deer planning will replace herd units with larger DCU's. Using this approach the Department proposes categorizing California deer herd units into 10 DCUs (Appendix I). Unlike the original deer herd boundaries management at the DCU level will focus on conservation and management at larger scales.

FIGURE 3.

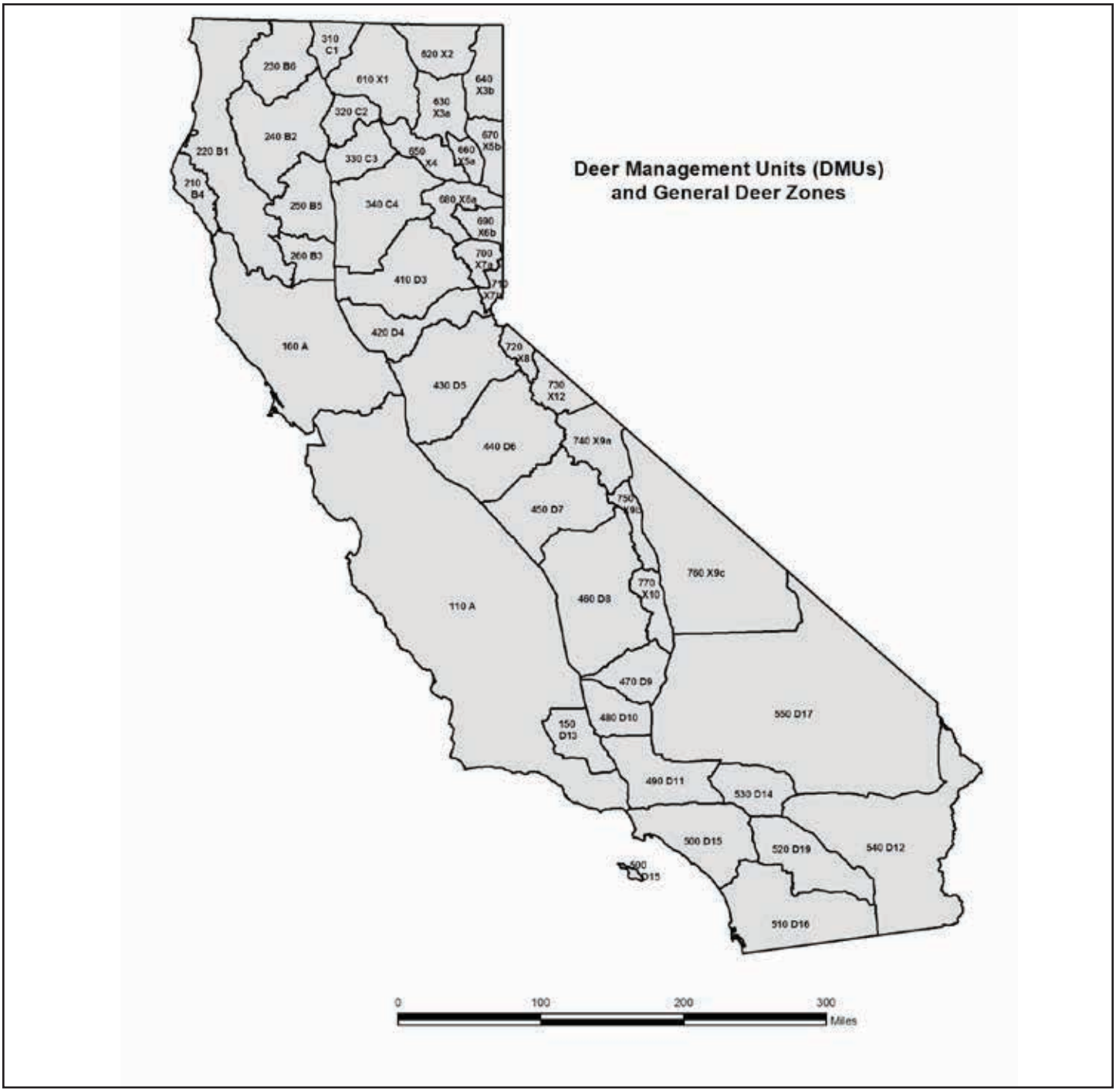
Proposed Deer Conservation Units Over Existing Hunt Zones, 2014.

Conservation and management by DCU will consider that deer are free ranging animals requiring relatively large expanses of wild lands, the habitats they use, the connectivity between those habitats, and ecosystem processes impacting their population(s) and distribution across the landscape. Assessment at this level will allow investigation of landscape use by deer and their interaction with other organisms.

Within the 10 DCUs, 44 Deer Management Units (DMUs equivalent to the 44 general hunt zones (Figure 4) are identified. Deer population data currently collected consists of herd composition (buck: doe: fawn ratios) and overwinter survival by DMU (or zone) and is used primarily to adjust California's essentially buck-only hunting programs.

FIGURE 4.

Deer Management Units (DMUs) and General Deer Hunt Zones, CDFW 2014.



Based on actions implementing the objectives in this Plan, the Department will focus on assessing existing DMU/deer hunt zone boundaries to determine if similarities in habitat types, populations and other biological information warrant revising zone boundaries. Reducing the number of zones will allow data analyses that are more robust and generalizable at a large population scale. The Department anticipates the DCU boundaries may also be adjusted over time as DMU/deer hunt zones are assessed. Actions to implement a monitoring and adaptive management approach on a scale that will allow assessment of deer populations across the landscape will facilitate conservation and management programs. Each DCU will have a management plan, developed through a public stakeholder process.

The overarching Plan goal is conserving the State's deer populations and their habitats.

This will be accomplished by developing and implementing practices that conserve populations and also provide for use and enjoyment by the public. To achieve the goal, five subordinate goals have been identified. Each has objectives discussed more fully in their respective sections, designed to achieve the Plan goals.

THE GOALS ARE AS FOLLOWS:
GOAL 1 Develop DCU plans;
GOAL 2 Develop updated population management objectives;
GOAL 3 Develop habitat conservation objectives;
GOAL 4 Develop research, monitoring and adaptive management objectives;
GOAL 5 Develop outreach objectives.

GOAL 1: Develop Deer Conservation Unit (DCU) Plans

OVERVIEW OF EXISTING DEER HERD MANAGEMENT PLANS

The deer herds of California were first described by Longhurst et al. (1952). A total of 111 distinct deer herds were described based on a general survey of deer ranges. A comprehensive deer herd management planning effort was initiated in 1977 as a result of the Legislature adopting the 1976 plan (Fish and Game Code § 450). As a result of studies associated with that effort, deer are currently described in 79 individual deer herd management plans. Some of these herds are the same as those described by Longhurst et al. (1952), but others were combined or redefined to reflect updated understanding of deer distribution and movements.

The comprehensive planning process was completed in 1985, with the majority of deer herds having approved management plans (signed by entities involved in plan preparation and/or implementation). Federal, state, and local agencies (and interested members of the public) were encouraged to play a role in the development of these plans. Each herd plan directs management activities based on goals and objectives contained within the individual plans.

As specified in Fish and Game Code, sections 450-460 (Appendix III), deer hunting is currently managed on a unit basis. Managing by DCU will include a re-assessment of physical and biological conditions by unit and by DCU but may also require regulatory change to fully implement a comprehensive DCU plan.

DEER CONSERVATION UNIT PLANNING (DCUs)

One of the most important goals of this Plan is delineating the DCUs and initiating development of DCU-specific management plans for implementation.

Changing stressors (e.g., habitat succession, development on wildlands, and climate change), methods for monitoring deer populations, and public attitudes towards managing deer necessitate revisiting deer management in California. Management by DCU would allow the Department to consider current and anticipated environmental, sociological, and economic conditions. Under DCU management, deer populations would be surveyed and assessed in larger units (groups of herds). Table 1 shows the proposed DCU development and implementation schedule based on internal prioritization. Detailed descriptions of the DCUs are provided in Appendix I.

Table 1. DCU Development and Implementation Schedule

DCU	Priority	Development Schedule	Implement Schedule
North Eastern Modoc Plateau, North Eastern Sierra, Eastern Sierra	1	April 2015 June 2015	July 2015
Klamath Mountains and Cascade Range, North Coast	2	July 2015	November 2015
Sierra Nevada, Central Coast, Transverse and Peninsular Ranges	3	November, 2015	March, 2016
Central Valley, Mojave and Colorado Deserts	4	March 2016	July 2016

DCU Plan Objectives

D1 Develop ten DCU plans reflecting the current scientific, environmental, sociological, and economic conditions as they relate to deer management. Each DCU plan will include defined boundaries, describe how populations will be estimated, identify monitoring strategies, identify objectives for managing deer hunting, through the allocation tags. From a habitat perspective, the DCU plans will include the key habitat areas where restoration/enhancement is needed to improve habitat for deer and details on how such efforts could be accomplished;

D2 Implement DCU specific activities and projects prioritized in this Plan.

GOAL 2: Develop DCU Population Management Objectives

Deer conservation and management actions have been on-going in California since the late 1880s, and since 1976, a population monitoring component with an emphasis on ensuring that deer harvest is consistent with herd plan goals.

The Plan initially retains the 44 Deer Management Units (DMU's) that are approximately aligned with the existing 44 general deer hunt zones, however, they will be re-evaluated. In addition to herd composition and over winter survival, in some zones it may be desirable to collect population demographic data (including sex/age ratio's, survival rates, recruitment rates, mortality rates/causes) to assist in decision making for population management. The state's deer population is estimated by hunt zone using a deterministic model that relies on harvest data from tag returns in conjunction with herd composition and overwinter survival data.

ANTLERLESS HUNTING

Since the late 1950's the Department has made its recommendations to the Commission and the Commission has implemented a hunting program where mostly male deer are harvested (Figure 5). The small amount of antlerless deer hunting in California takes place in the form of special hunts. These hunts include: Private Lands Management, archery, muzzleloader, apprentice, military and a few special hunts on Department owned lands.

Antlerless deer hunting is regulated by Fish and Game Code sections 457-460, which gives veto authority to 37 of 58 California counties to accept, modify, or reject Department proposals for the hunting of antlerless deer in their respective counties. Because of this authority (and other reasons) the result has been a predominantly "bucks only" hunting program. Antlerless deer are defined as: female deer, fawns of either sex other than spotted fawns, and male deer with an unbranched antler on one or both sides which is not more than three inches in length (Cal. Code Regs., tit. 14 § 351(b)).

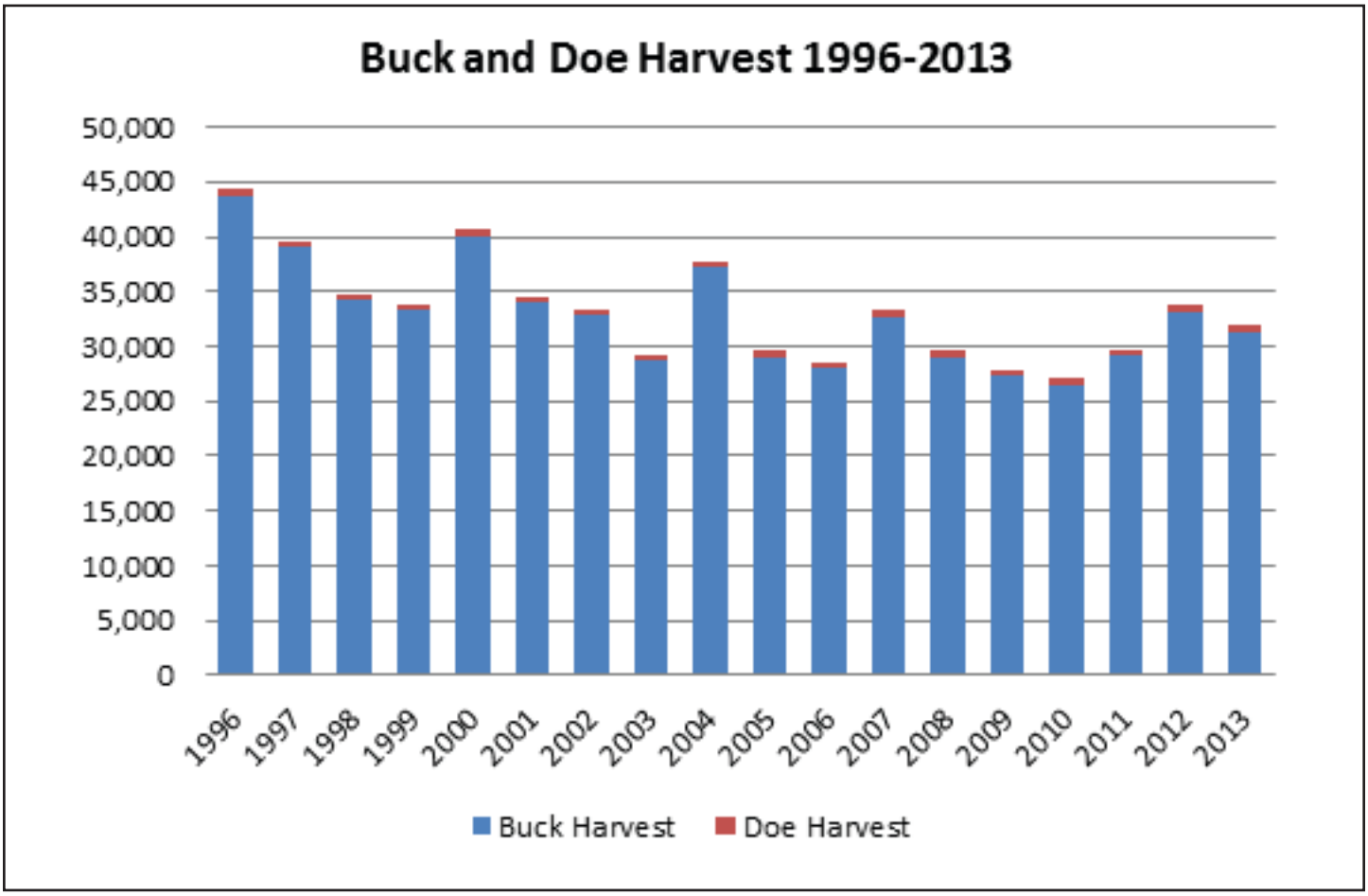
Doe hunting occurs in every state in the country. However it has been controversial in California since the 1950s resulting in very limited use and inability to manage the entire population. Hunting of the female segment of the population is an important tool for managing deer populations and is evidenced by its common use in other states, and use to manage California's elk.

Similar to California's regulatory process for hunting, most of the nation's wildlife agencies do not set actual hunting regulations. The wildlife agency analyzes population and harvest data, determines the appropriate level of harvest for different age and sex classes, based on plan goals and objectives, and makes a recommendation to its commission. The board or commission considers the recommendation and approves (or disapproves) the hunt then sets regulations.

For California antlerless hunting, the Department must submit its proposals to the Commission, and in the 37 veto counties, the board of supervisors. Of western states that support black-tail or mule deer, California is the only state that must seek approval for antlerless hunts from both a county board and its own commission.

FIGURE 5.

Estimated buck and doe harvest since 1996. Doe harvest has averaged less than 2 percent of the total harvest annually.



Efforts to achieve population objectives can be expressed by managing harvest of the population. For example, doe harvests are considered effective in reducing density dependent impacts including disease, starvation and habitat degradation. For example, Bartman (1992) reported that reducing deer population density by increasing the doe harvest resulted in increased survival of juveniles, and McCullough (2001) reported that harvesting more does reduced population density resulting in increased number of bucks harvested over a seven year period. However, in California, does comprise less than two percent of the total deer harvest, and the level of doe hunting in California is not substantial enough to result in a significant change in the management of desired buck:doe ratios nor is it enough to significantly modify the overall population number and relieve potential impacts to over-browsed deer range.

A more robust data collection system that includes measurement of critical habitat variables along with standard population information would improve management of deer in California. Deer population abundance estimates and information on survival, recruitment and non-hunting mortality will be collected at the scale and specificity needed to inform management questions will be developed. Improved understanding of deer habitat relationships, tracking of stressors, and understanding how they influence the population will also benefit future management of deer. Gathering and compiling of robust data and translating that data into desired conservation actions (recommendations for habitat conservation projects and deer harvest) that would be proposed to counties and the Fish and Game Commission for consideration will be the outcome of improved biological data.

POPULATION MANAGEMENT OBJECTIVES

The most important population management objectives are to estimate populations and long-term trends by DCU. No single method can be implemented in all DCU's and no single method alone will provide the robust data necessary to inform sound management decisions. DCU specific assessment protocols will be developed after reviewing existing information. Objectives to reach this goal are listed below (P1-P4). Objectives P5-P12 were developed to assist in establishing deer hunt tag quotas and to better manage deer.

PM1 Refine and implement population assessment methods using appropriate science-based methods.
PM2 Conduct baseline population surveys to estimate populations within each DCU.
PM3 Develop and implement methods to establish indices of deer population trends.
PM4 Use statistical power analysis to determine level of survey effort required to obtain robust population and harvest data intensity.
PM5 Develop and implement studies to assess mortality and recruitment in DCU's.
PM6 Use an adaptive management approach to evaluate the effects of hunting programs on deer populations.
PM7 Use population demographics and models, to determine appropriate harvest level including antlerless harvest.
PM8 Conduct hunter and general public attitude surveys to understand public perspectives, and desires related to deer conservation, management, and hunting; and hunter expectations.
PM9 Review current depredation policy implementation and make recommendations regarding legislative and/or regulatory changes to minimize conflict with agriculture and property damage and losses of deer due to depredation.
PM10 Develop and implement innovative ideas to address management and control of urban deer populations
PM11 Investigate non-hunting mortality including: predation, illegal harvest, commercial and residential development, timber harvest, water infrastructure, and transportation projects.

GOAL 3: Habitat Conservation

Deer populations are limited by their habitat (Mule Deer Working Group 2004). Suitable habitat includes a combination of food, water, cover, and space arranged in a way that meets the needs of a species. Deer populations inhabit large areas of diverse habitats to meet their needs for food, water, and cover. Successful conservation of California's deer habitat (Figure 4) includes protecting and restoring connected habitats between seasonal ranges to prevent fragmentation and decline or loss of habitat suitability.

Seventy million of California's 101 million acres is considered habitat for deer. Approximately 47 percent of this habitat is privately owned. Of this 47 percent, a substantial amount is owned by timber companies and private ranches. Public land makes up about 48 percent of the State's deer habitat with most of it federal land administered by the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM) (Figure 6). The remaining 5 percent is owned and administered by the state as parks, forests, and wildlife areas. The Department owns and directly manages approximately one percent of the state's deer habitat.

Because the Department directly manages about one percent of California's deer habitat, the opportunity for the Department alone to significantly improve the state's deer habitat quality are not realized. Conserving and managing at a landscape level requires partnerships with public and private landowners/managers. Delineation and mapping of key areas of public and private lands for deer will assist the Department in understanding deer/habitat relationships when accompanied by study of habitat selection, movements, foraging, productivity, and seasonal use patterns.

The U.S. Forest Service and the Bureau of Land Management are multiple use land management agencies and very important for deer habitat and providing areas for public hunting. Allowable land uses include mining, grazing, OHV use, timber harvest, and renewable energy development (Federal Land Policy and Management Act of 1976, National Forest Management Act 1976). Private lands also support these land uses as well as commercial and residential development projects. Not all land uses are compatible with wildlife conservation and some uses cause the loss or degradation of habitat. Habitat loss associated with residential and commercial development is considered to have the greatest impact on habitat quantity used by deer. Additionally, construction impacts can disturb and influence the behavior of deer. Development brings more roads and greater access to wildlands and increased interaction with people thereby resulting in decreased habitat quality and increased risk of habitat fragmentation and mortality.

Habitat loss in key areas where deer concentrate during winter, migration, and fawning will have a relatively higher impact than losses in areas with low deer densities. Identifying and delineating important deer habitat areas for protection and improvement is important for successful conservation of deer populations in the future.

There are government programs that provide incentives to land managers (both public and private) to enhance management practices for wildlife, and these programs increase the opportunity for managing private lands for wildlife such as deer. The California Legislature enacted the Private Lands Management (PLM) Program and the Shared Habitat Alliance for Recreational Enhancement (SHARE) Program for private landowners and delegated authority to the

Department to implement these programs. Other incentive programs include the California Wildlife Conservation Board's (WCB) habitat restoration programs for riparian, rangeland, grazing land, grassland, oak woodlands, and forest habitats. The federal Farm Bill has land protection programs as well as restoration and land improvement programs, such as the Wildlife Habitat Incentive Program.

Habitat Conservation Objectives

H1 Conduct resource inventory and update deer range maps reflecting key areas such as winter range, summer range, fawning areas, and migration routes.

H2 Provide science-based recommendations to state, city and county planners for maintaining the ecological integrity and connectivity of landscapes for deer and other wildlife species.

H3 Through information obtained from studies, identify, delineate and target important areas for conservation through acquisition, conservation easement, restoration or enhancement,

H4 Increase collaboration with private landowners to establish and achieve target acreages for habitat improvement/protection measures.

H5 Re-establish strong working partnerships with the USFS and BLM for deer conservation and management on public lands.

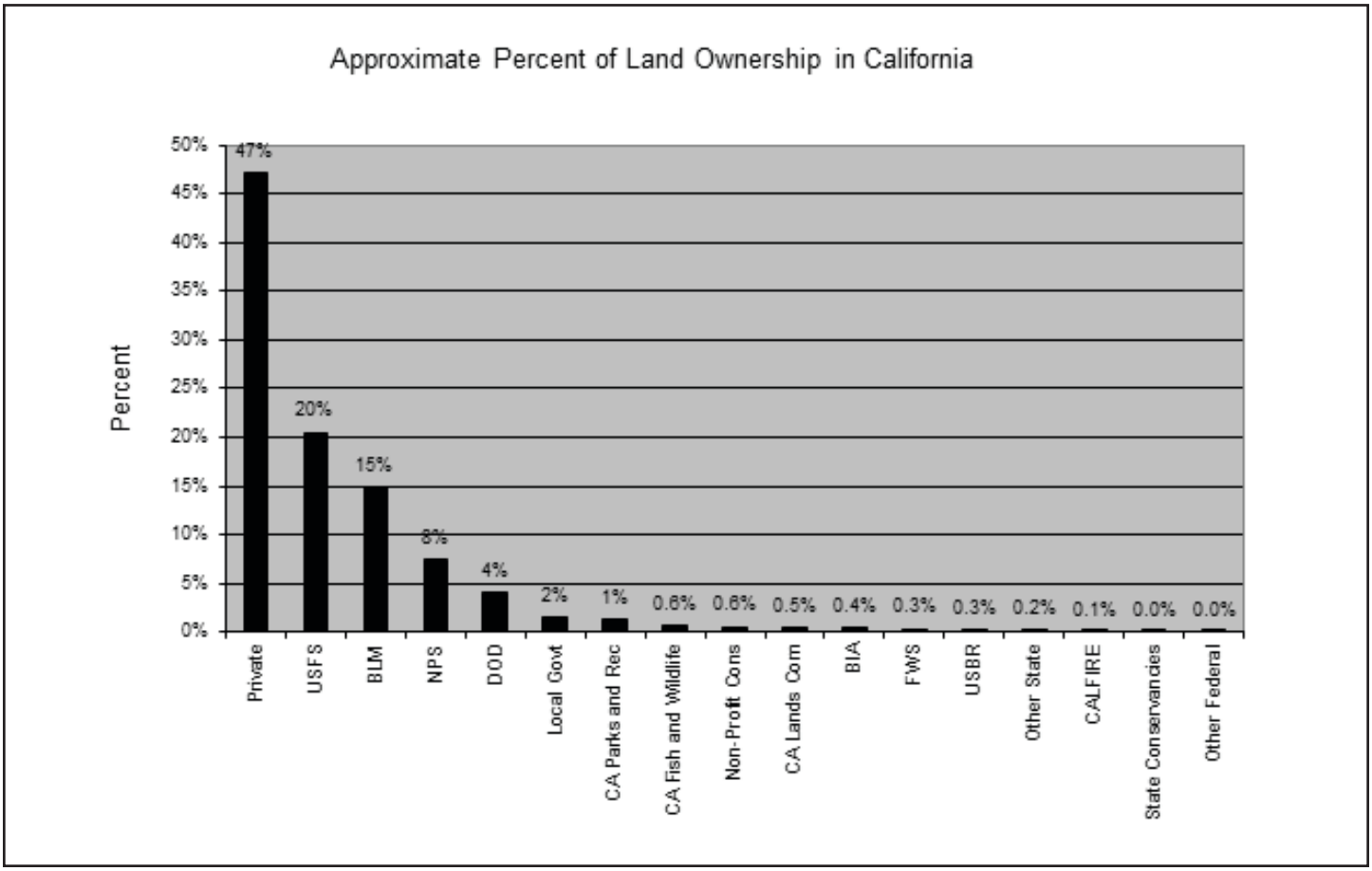
H6 Establish habitat conservation priorities, including recommending changes in public land policy and implementation of that policy, to effectively-manage habitat as a mosaic of successional habitats that will benefit deer and other early successional dependent wildlife.

H7 Work with land managers, both public and private, to maintain wildlife habitat through incentive programs such as SHARE, PLM and programs sponsored by the WCB,USFWS, or USDA.

H8 Coordinate management activities with federal, state and private landowners and neighboring state wildlife agencies where interstate herds exist.

FIGURE 6.

Land Ownership in California Source: CAL FIRE – FRAP, California Multi-Source Land Ownership (ownership 11_2), 2011.



GOAL 4: Develop Improved Monitoring, Adaptive Management, and Applied Research Objectives

Developing and implementing improved monitoring methods will allow us to monitor deer populations and track the effectiveness of our population management and harvest strategies, habitat manipulation projects and habitat change over time.

An important component of the monitoring strategy is assessing the effectiveness of our management actions relative to the plan's goals and objectives through an adaptive management approach. As projects, deer populations, and habitats are monitored through time, the Department will initiate responsive management actions dictated by such information.

The Department will be updating its baseline deer population information and focusing on robust deer population estimators. Therefore, applied research projects will need to address questions directly related to population demographics. These questions will include addressing methods for estimating populations, assessment of population models and/or indices, non-hunting mortality, growth rate, survival and recruitment.

MONITORING

Monitoring Objectives

M1 Establish thresholds for detecting population changes; develop improved indices and monitor population trends relative to baseline population estimates
M2 Organize, analyze, store, and disseminate population monitoring data.
M3 Monitor deer habitat loss and change over time.
M4 Monitor habitat restoration and enhancement projects to ensure project goals and objectives are being met
M5 Coordinate population monitoring activities with other agencies and neighboring states as applicable.
M6 Develop DCU specific monitoring schedule that includes type, location and timing of monitoring.

Adaptive Management Objectives

AM1 Develop management objectives, alternative management scenarios, and models predicting outcomes from those scenarios to manage within an explicit adaptive management framework
AM2 Develop and implement schedule for assessing population abundance, monitoring and management techniques.

APPLIED RESEARCH

Applied research is critical to address ecological and management uncertainty related to deer. Of initial high priority is how to obtain robust estimates of deer populations upon which management decisions can be made. It is likely that obtaining these estimates will require a variety of methods to augment methods currently in place. Although estimating abundance is the most important question, data needs go beyond abundance estimates. The Department also needs updated information to develop annual hunt tag quotas. This includes demographic information on deer and assessment of population modeling methods. DCU-specific research needs and projects will be prioritized to ensure a logical process for gathering new data and applying it to management.

Applied Research Objectives

Research projects proposed to answer questions on recruitment, mortality, disease, or monitoring methods will be considered priorities once baseline population estimates have been established. Research projects will yield (at a minimum) a final report of the study results. Final reports will include: analysis and interpretation of data collected for the study. Depending on the scope of the project, journal publication may be applicable. Acceptable applied research topics include those listed below:

R1 Assess/validate population estimators, monitoring and modeling methods.
R2 Assess recruitment and survival.
R3 Assess non-hunting related sources of mortality, including predation and illegal harvest (poaching).
R4 Assess whether traditionally migratory deer herds are being replaced with largely non-migratory deer herds as a consequence of human encroachment or other factors.

GOAL 5: Develop Outreach

Californians value deer for different reasons: for hunters as game animals, for others as prey for predators in a functioning system, for indicators of the ecologic condition of various habitats, or for their aesthetic value alone. No matter what the motivation, Californians share a common interest in the way the Department and Commission manage deer populations.

This draft Plan is intended for public review and comment. The Department will consider the opinions of the public in developing this Plan. To ensure opinions of the public are considered, each DCU Plan will also include an outreach component to seek involvement of interested stakeholders. These stakeholders include agencies, private landowners and members of the general public. Additionally, the Department will seek to specifically improve coordination and collaboration with the USFS and BLM at both the regional and headquarter perspectives to develop actions to benefit deer habitat to the extent possible.

The majority of public input the Department has traditionally received regarding deer management activities has been from deer hunters and non-profit wildlife conservation organizations. Hunters fund nearly all the deer management activities through their purchase of hunting licenses and deer tags, and they remain a valued constituent and voice for influencing the deer management program.

The Department has established multiple methods of communication with the public that are used by deer hunters, yet in order for the Plan to be successful it should receive broad support from hunters and non-hunters alike. The outreach will also solicit input from the general public so that the Department will understand their interests and desires as it relates to this effort.

To ensure that funds generated from big game hunt tag sales are used for the benefit of big game species, the Big Game Management Account was created. Section 3953 of the Fish and Game Code requires that revenue from the sale of antelope, elk, deer, wild pig, bear and sheep (big game) tags be deposited in this account. Section 3953 also builds transparency into the management of big game funded projects by requiring that an advisory committee review and comment on projects funded from the Big Game Management Account. The Department posts project related information (including budgets) to its web site.

The Department meets regularly with the advisory committee to discuss projects.
Members of the advisory committee include non-governmental organizations (NGO's). The advisory committee has been instrumental in implementing important habitat acquisition and improvement projects throughout the state and is important to the Department's outreach program.

Although the Outreach actions will solicit the opinions of stakeholders it will also serve as a medium for the Department to provide general and specific information on deer management needs and issues to agencies, landowners and the general public. As discussed above the Department directly manages less than one percent of deer habitat in the state. For the Department to manage deer at a landscape level, outreach to public land management agencies and private landowners is important.

DCU specific outreach elements will be designed to provide basic population information, relationships of deer populations with habitat quantity, quality, and other limiting factors, as well as "best management practices" correlated with different types of management goals. This information will be presented to educate landowners, agencies and the general public on why deer management is necessary

Outreach Objectives

O1 Provide population information on the deer management webpage (http://www.CDFW.ca.gov/wildlife/hunting/deer/index.html); make more user friendly by separating it from the hunting results and posting it in its own location;
O2 Issue press releases regarding deer management activities, the importance of deer management, what DCU plans are designed to achieve, and how the public can get involved in the DCU development process;

O3 Identify and provide on the website the Department's priorities for research and resource assessment needs in California for prospective investigators;
O4 Provide information on the Department's deer management website regarding where, when, and how the public can safely enjoy viewing deer while minimizing impacts to the deer being viewed;
O5 Develop information bulletins, pamphlets, and/or leaflets regarding common deer conservation and management issues and make them available to the general public through the Department deer management website;
O6 Work with the Department's Office of Communications Education and Outreach to develop and implement a comprehensive public education program, including educational, research and control elements. Coordinate Department programs with other local, State and Federal agencies to facilitate the collection and dissemination of information. This will include programs to educate people on the potential impacts from residential developments as well as some solutions available to deal with the conflicts
O7 Update existing and develop new printed materials that provide information regarding the effects of feeding deer. Use Department website to maximize dissemination of this information;
O8 Expand the Department's role in the Western Association of Fish and Wildlife Agencies (WAFWA) Mule Deer Working Group by contributing to and disseminating its publications and other products;
O9 Develop local and statewide contacts for collaboration on deer habitat improvement and deer management efforts;
O10 Meet annually with state and federal agencies and non-governmental organizations to develop strategies and work plans to benefit deer;
O11 Attend County Fish and Game Commission and Board of Supervisors meetings to provide "real-time" information related to deer distribution and abundance and discuss the cost/benefits of proposed actions impacting deer populations;
O12 Continue working with the Big Game Advisory Committee to identify and implement important deer conservation projects. Continue to post project documents (proposals, contract/grant documents, reports) and budget information on website.

APPENDIX I

Deer Conservation Unit Descriptions

The ecological diversity of California is largely a result of the various mountain ranges in the state. These mountains dictate precipitation and temperature, which in turn play a large part in determining distribution of vegetation communities throughout the state. The California Geological Survey recognizes eleven naturally defined geologic regions (called geomorphic provinces) in California, which display unique, defining features based on geology, faults, topographic relief and climate (California Geological Survey 2002). These geomorphic provinces were used in conjunction with vegetation type, deer behavior, common deer management concerns, and deer hunt zones to develop ten Deer Conservation Units in California.

Datasets used to define DCUs included California Geomorphic Provinces from the California Geological Survey, topography from the U.S. Geological Survey, and vegetation from the California Department of Forestry and Fire Protection's Fire Resource and Assessment Program (FRAP). Based on criteria identified above, the Department identified the following 10 DCU areas.

The North Coast DCU covers 8,662,316 acres of mainly private land. Ownership is 73% private and 27% public, of which 12% is owned by the USFS, and 6% by the BLM. The deer of this DCU are migratory where topography is more rugged, and may exhibit some movement up and downslope and/or switching between north and south facing slopes to take advantage of temperature gradients on less extreme terrain; otherwise they are considered resident (Taber and Dasmann 1958). This DCU is located along the Pacific Coast in northwest California, encompassing the Coast Ranges from the Oregon border to the San Francisco Bay. The Coast Ranges are northwest trending mountains and valleys that generally run parallel to the San Andreas Fault and the Pacific Coast (California Geological Survey. 2002). Elevation ranges from sea level to 3,000 ft. near the coast, and 1,000 to 7,500 ft. in the inland areas (McNab and Avers 1994). Habitats listed in the California Wildlife Habitats Relationships (CWHR) classification scheme for this DCU include Douglas-fir, Redwood, Ponderosa Pine, Montane Hardwood, Valley Oak Woodland, Coastal Oak Woodland, Montane Riparian, Valley Foothill Riparian, Mixed Chaparral and Coastal Scrub (Mayer and Laudenslayer 1989). Agricultural fields, pastures, and vineyards occur in valley bottoms.

The Central Coast DCU is composed of 10,804,400 acres of land, of which 68% is privately owned and 32% in public ownership. Within the public lands,14% is owned by the USFS and 6% by the BLM. This unit supports resident deer that may exhibit elevational movement or shifts in slope/hillside use in response to seasonal changes in weather and forage conditions. The Central Coast DCU is composed of the Coast Ranges occurring south of the San Francisco Bay. As in northern California, these mountains and valleys run subparallel to the San Andreas Fault and the Pacific Coast (California Geological Survey 2002). Elevation ranges from sea level to 3,500 ft. (McNab and Avers 1994). CWHR classifications include Montane Hardwood-Conifer and smaller areas of other conifer types, Montane Hardwood, Coastal Oak Woodland, Valley Oak Woodland, Blue Oak Woodland, Mixed Chaparral, Coastal Scrub, Chamise-Redshank Chaparral, Montane Riparian and Valley Foothill Riparian. Other man-made habitat types found in this DCU are Eucalyptus, Pasture, Cropland, and Orchard/Vineyard (Mayer and Laudenslayer 1989).

The Transverse and Peninsular Ranges DCU contains 9,426,348 acres of land that is fairly evenly distributed between private and public land owners (52% private, 48% public). The main public land owners are the USFS (21%), CDPR (8%), and BLM (6%). This unit is inhabited primarily by resident mule deer although movement from high to low elevation or between warm and cool aspects of hillsides does occur in winter, especially during years of heavy snow. This unit lies in the southwest corner of the state and includes the Transverse and Peninsular Mountain Ranges extending to the Mexican border. The Transverse Ranges are composed of steep mountain ranges and valleys which lie oblique (east-west trending) to the Coast Ranges and the Peninsular Ranges. To the southeast lie the Peninsular Ranges, a series of ranges separated by northwest trending valleys that run along faults branching from the San

Andreas Fault (California Geological Survey. 2002). Elevation ranges from sea level to 3,500 ft. along the coast, and between 500 and 11,500 ft. inland (McNab and Avers 1994). CWHR Habitat types include Montane Hardwood-Conifer, Coastal Oak Woodland, Mixed Chaparral, Chamise-Redshank Chaparral, Coastal Scrub, Annual Grassland, and various wetland habitats. Agricultural types (Orchard-Vineyard, Pasture, and Cropland) also occur in this DCU as well as Eucalyptus (Mayer and Laudenslayer 1989).
The Mojave and Colorado Deserts DCU is an expansive area of 25,209,157 acres that is primarily owned by the Federal government (close to 80%).17% of the area is in private ownership and 83% is publicly owned. This unit is inhabited primarily by resident deer that may exhibit movement in response to seasonal availability of water or drought. Burro deer in the Colorado River area of California were found nearer the river during dry seasons than during the rainy seasons when they were as much as 100 km away in mountain ranges (McLean 1930, Longhurst and Chattin 1941). This unit lies in the southeast portion of the state, south of the Great Basin and east of the southern California mountain ranges. This DCU borders the states of Nevada and Arizona to the east, and Mexico to the south. Mountain ranges to the north and within the Mojave Desert have cold winters with snow at high elevation. Habitat is dominated by desert vegetation with the following CWHR classifications: Pinyon-Juniper, Desert Scrub, Desert Succulent Shrub, Alkali Desert Scrub, Desert Wash, Desert Riparian, Joshua Tree, and Palm Oasis (Mayer and Laudenslayer 1989).

The Sierra Nevada DCU covers 12,774,042 acres, of which 40% is in private ownership and 60% publicly owned. Public lands include the USFS (41%), NPS (13%), and BLM (4%). Deer in this DCU are both migratory and resident. This DCU encompasses the nearly 400 mile long Sierra Nevada Mountain Range and foothills. The east side of this range is high, and rugged, with multiple ridges. In contrast, the west slope is a more moderate grade overall, cut with deep river canyons, bordered at its base by the Great Valley (California Geological Survey 2002). Elevation ranges from 500 ft to 14,495 ft at the highest crest of Mt. Whitney. Snow is typical above 6,000 ft. and summers are warm and dry (McNab and Avers 1994). The west side of the Sierra Nevada receives most of its moisture from storms, creating a rain shadow effect on the east side of the range. Habitat classifications are dominated by a variety of tree dominated habitats. CWHR types for this DCU include Subalpine Conifer, Red Fir, Lodgepole Pine, Sierran Mixed Conifer, White Fir, Ponderosa Pine, Aspen, Montane Hardwood-Conifer, Montane Hardwood, Montane Riparian, Montane Chaparral, Mixed Chaparral, Wet Meadow, Riverine, Lacustrine, and a few small areas of other miscellaneous habitats. Orchard-Vineyard is also found in the foothills on the west slope of the Sierra Nevada Mountains (Mayer and Laudenslayer 1989).

The Eastern Sierra DCU contains 2,982,040 acres of mostly (95%) public land. Only 5% of the area is in private ownership. The main land owner is the USFS (58%), while the BLM owns another 28%. This DCU contains migratory deer that summer in the upper elevations of the Sierra Nevada Mountains and winter on shrublands on the east side of the mountain range. The unit stretches along the east side of the Sierra Nevada from Mono County south into Inyo County (California Department of Fish and Game et al. 1998). CWHR classifications include Eastside Pine, Jeffrey Pine, Juniper, Aspen, Low Sage, Bitterbrush and Sagebrush. A small amount of pasture and cropland also occur (Mayer and Laudenslayer 1989).

The Northeast Sierra DCU is composed of 2,228,295 acres that is 35% privately owned and 65% in public ownership. The main land owner is the USFS which owns 56% of the area. Deer in this DCU are generally migratory, summering in the Sierra Nevada Mountains and wintering on the east side of the Sierras including some parts of Nevada. This DCU extends from Susanville to south of Lake Tahoe along the California-Nevada state line. The unit is bordered on the west by Highway 89 north of Lake Tahoe and the Sierra Crest in the south (California Department of Fish and Game et al. 1998). Common CWHR classifications are Subalpine Conifer, Lodgepole Pine, White Fir, Jeffrey Pine, Eastside Pine, Juniper, Aspen, Montane Hardwood-Conifer, Montane Riparian, Bitterbrush, Sagebrush, and Montane Chaparral (Mayer and Laudenslayer 1989).

The Northeast California/Modoc Plateau DCU encompasses 6,515,075 acres of which 35% is privately owned, and 65% in public ownership. The primary public landowners are the USFS (41%) and the BLM

(21%). This DCU is inhabited primarily by migratory deer populations. The unit is located in the extreme northeast corner of the state and includes the volcanic tablelands of the Modoc Plateau (California Department of Fish and Game et al. 1998). The DCU extends from the Oregon state line, and continues south along the eastern border of California to Susanville. Elevation on the Modoc Plateau ranges from 3,000 ft. to 9,900 ft (California Geological Survey 2002). CWHR classifications include Lodgepole Pine, White Fir, Eastside Pine, Jeffrey Pine, Juniper, Aspen, Montane Hardwood-Conifer, Montane Riparian, Low Sage, Bitterbrush and Sagebrush. Pasture and cropland also occur (Mayer and Laudenslayer 1989). Agriculture and pasture lands occur on private property, and alfalfa fields have replaced winter range in some areas, at times resulting in heavy deer use of the crop (California Department of Fish and Game et al. 1998). The Klamath Mountains and Cascade Range DCU covers 8,612,388 acres that is 38% private land and 62% public. The USFS is the main land owner, accounting for 56% of the area. This unit is inhabited by both migratory and resident deer. Deer are migratory where topographic variation is high while in other areas deer exhibit little or no seasonal movement. This DCU borders Oregon to the north and includes both the rugged Klamath Mountains and the volcanic cones of the Cascade Range. Elevation ranges from 1,500 ft. to Mt. Shasta at 14,162 ft. This area has a mountain climate with snow in the winter and mild to moderate heat in the summer (McNab and Avers 1994). Primary habitat types by CWHR classification are Klamath Mixed Conifer, Sierran Mixed Conifer, Red Fir, White Fir, Douglas-Fir, Ponderosa Pine, Aspen, Closed-Cone Pine-Cypress, Montane Hardwood-Conifer, Montane Hardwood, Montane Riparian, Montane Chaparral, Mixed Chaparral, Chamise-Redshank Chaparral, Wet Meadow and other wetland types. Smaller areas of Pasture and Cropland are also present (Mayer and Laudenslayer 1989).

The Central Valley DCU is composed of 13,721,468 acres of predominately private lands. 95% of the area is in private ownership and only 5% is public land. This unit is inhabited by non-migratory deer. The Central Valley DCU is an alluvial plain approximately 50 miles wide and 400 miles long that lies in the center of California, bounded by the Coast Ranges to the west and the Sierra Nevada Mountains to the east. It contains the Sacramento and San Joaquin Valleys, along with their associated river systems (California Geological Survey 2002). Elevation in the Central Valley DCU ranges from sea level to 800 ft. (McNab and Avers 1994). Most of the Central Valley DCU has been converted to irrigated agriculture, which is reflected in the dominate CWHR habitat types of Cropland, Orchard-Vineyard, and Pasture. Other habitat types include Annual Grassland, Valley Oak Woodland, Valley Foothill Riparian, Fresh Emergent Wetland, Riverine, and Eucalyptus (Mayer and Laudenslayer 1989). This area supports a low density of resident deer, but in localized areas where habitat conditions are favorable, deer can thrive to the point of overpopulation. High densities of deer mainly occupy areas associated with water, such as riparian and wetlands. The Central Valley contains an abundance of farmland, which can result in crop damage by deer.

APPENDIX II

Draft Deer Conservation Unit (DCU) Outline

I. Population Management
  A. Population Assessment Methods
    1. Baseline abundance estimates
    2. Trend monitoring
    3. Recruitment, survival, non-hunt related mortality
  B. Establish draft population goals
II. Habitat Conservation
  A. Habitat Assessment
    1. Evaluate existing information on critical deer areas
    2. Identify data needs and methods to fill data gaps
    3. Store data in central location
    4. Identify and prioritize important areas and ways to conserve them
    5. Identify private and public land managers and work collaboratively to conserve deer habitat
  B. Establish draft habitat goals (final goals to be established as part of public process identified in IV. 6, below)
III. Monitoring, Adaptive Management and Applied Research
  A. Monitoring
    1. Set thresholds for detecting change in populations, develop indices and monitor populations relative to baseline
    2. Analyze, store and disseminate population data
  B. Adaptive Management
    1. Develop processes for implementing changes if monitoring results indicate that changes in management are warranted
    2. Develop and implement schedule for assessing population abundance, monitoring and management techniques
  C. Applied Research
    1. Assess/validate population estimators, monitoring and modeling methods
    2. Assess recruitment and survival
    3. Assess non-hunt related mortality
    4. Assess whether deer are becoming non-migratory as a result of human activities
IV. Outreach
    1. Use the Department website and press releases to provide information on deer conservation and management activities
    2. Develop deer conservation literature and distribute to the public
    3. Meet regularly with private landowners, federal, state and local agencies to discuss deer conservation and management issues.
    4. Attend public meetings to inform agencies and the public about current deer conservation and management issues.
    5. Continue working with NGO's to develop and implement deer conservation projects.
    6. Follow all requirements (notifications, filing schedules, public meetings, comment periods, etc.) necessary to have each DCU plan certified as a Final Environmental Document Regarding Deer Management under the Fish and Game Commission's Certified Regulatory Program.

APPENDIX III

Laws and Policy Guiding Deer Management
California Fish and Game Code
Sections 450 – 460

CHAPTER 5. MANAGEMENT OF DEER

450. Conservation Principles in Accordance With Sec. 1801

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

451. General Deer Hunting Season

As used in this chapter "general deer hunting season" means the annual season for the area in question as is set by the commission under its general regulatory powers, or set by statute, for the taking of male deer.

452. Management Units

The department shall designate deer herd management units and designate the manager for the units. Such units may encompass a single deer herd or a group of deer herds having similar management and habitat requirements and characteristics. Boundaries of such units, unless appropriate, need not follow county boundary lines.

453. Management Unit Plan Development

The department shall develop plans for such deer herd management units. The objectives of such plans shall be the restoration and maintenance of healthy deer herds in the wild state and to provide for high quality and diversified use of deer in California.

454. Content of Management Unit Plans

Such management plans shall contain the following program elements:

(a) Document existing information on deer herd management units and programs to obtain information that may be needed.

(b) Develop programs to maintain and increase the quality of deer habitat statewide. Such programs will emphasize cooperative action between the department and the appropriate land management entities, both public and private. Emphasis shall be directed towards identifying critical deer habitat areas and the maintenance and management of such areas.

(c) Develop programs to reduce natural mortalities where such reduction may be critical to meeting deer herd plan objectives.

(d) Develop programs to decrease the illegal taking of deer through modern law enforcement methods supported by public and private cooperative efforts.

(e) Develop diversified recreational use programs, including both hunting and nonhunting uses, consistent with the basic individual deer herd management unit capabilities.

455. Annual Review of Management Unit Plans

Deer herd management unit plans shall be reviewed annually and shall be the basis for department recommendations to the commission pursuant to this chapter.

456. Progress Reports; Program Recommendations

(a) The department shall biennially report to the Legislature and to the Fish and Game Commission on the progress that is being made toward the restoration and maintenance of California's deer herds. The first report shall be submitted on or before October 1,
1989. The report shall include program activities regarding deer habitat, particularly addressing problems dealing with identification and preservation of critical deer habitat areas; the amount of revenue derived from the sale of deer tags during the two previous fiscal years; a list of expenditures during the two previous fiscal years and proposed expenditures during the current fiscal year; and a report of general benefits accrued to the deer resources as a result of the program.

(b) The department shall not recommend to the commission any deer management program or any modification of the commission's deer hunting regulations submitted pursuant to Section 460 unless the recommendations are consistent with adopted deer herd management plans.

457. Annual Recommendations; Antlerless Deer

The department shall determine prior to December 15 of each year its proposed recommendations to the commission, including its recommendations as to whether any antlerless deer hunts should be ordered. The recommendations of the department shall include the number, if any, of antlerless deer that should be taken in units, whether the permits should be either-sex permits, the proposed dates for each such taking, and the number of permits proposed for each unit.

458. Notice of Recommendations

The department not later than December 15 shall notify, by certified mail, the board of supervisors of each county affected of the details of its recommendations under Section 457.

The board of supervisors of any affected county may elect to hold a public hearing on the proposed recommendations of the department. Any such hearing shall be held prior to February 1. The director or his or her representative shall attend the hearing.

The board of supervisors of any county to which this section is applicable may, by resolution, elect not to exercise the rights conferred by this section.

This section applies only to the counties of, and to those districts or parts of districts in, Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Sierra, Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Glenn, Humboldt, Imperial, Inyo, Lake, Madera, Mariposa, Mendocino, Merced, Mono, Monterey, Napa, Nevada, Orange, Placer, Riverside, San Luis Obispo, Santa Barbara, Santa Clara, Tehama, Tuolumne, Yolo, and Yuba Counties.

459. Objections and Modifications To Recommendations

The board of supervisors of any county specified in Section 458 which has held a public hearing pursuant to Section 458 may, not later than February 1, by resolution, object to the proposed recommendations of the department or may, by resolution, determine that the proposed recommendation should be modified, setting forth the necessary modifications.

A resolution objecting to, or setting forth modifications of, the proposed recommendations shall be based upon the testimony and information presented at the hearing or presented to the board of supervisors at its meeting to consider the resolution.

The department shall not recommend to the commission, and the commission shall not authorize, the taking of antlerless deer in a county specified in Section 458 if it has received from the board of supervisors of that county a resolution objecting to that taking. If a board of supervisors of a county has submitted a resolution determining that the department's proposed recommendations on the taking of antlerless deer should be modified for that county, the department shall either so modify its recommendations and the commission shall so modify its orders or the department shall not recommend, and the commission shall not authorize, the taking of antlerless deer in that county.

460 General Deer Hunting Seasons, Etc. – Recommendations

Prior to the February meeting of the commission as required in Section 207, the department shall recommend to the commission those deer herd units to be placed under a general deer hunting season. At the same time, the department shall recommend to the commission, subject to the provisions of Sections 458 and 459, whether any antlerless deer should be taken and in what deer herd units antlerless deer are to be taken. If in the judgment of the department there are deer herd units in which hunting pressure would adversely affect the deer herd, impair the hunting experience, or endanger the public safety, the department shall also recommend to the commission those deer herd units where hunter numbers should be restricted and which should be removed from the general deer hunting season designation. The department shall inform the commission of the condition of each deer herd unit. Upon receipt of the recommendations and information required in this section, the commission shall make that material known to the public and its determinations regarding proposed regulations. The recommendations of the department shall, in accordance with the provisions of Sections 458 and 459, include the number, if any, of antlerless deer that should

be taken in deer herd units, whether the permits should be either-sex permits, the proposed dates for the taking, and the number of permits proposed for each deer herd unit. At the same time, the department shall recommend the establishment of any hunter-restricted quota units, if needed, and the number of the quota and manner in which the quota permits should be issued.

APPENDIX IV

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