

C. What Influences Deer Numbers and Health?

An animal's habitat provides it with food, water, and protection from predators and the elements. The amount and quality of the habitat is what determines the number of deer in an area; its "carrying capacity". Carrying capacity is often thought of as the maximum number of animals that a particular area can support. When determining carrying capacity many deer biologists consider animal condition as a good indicator. It is commonly recognized that the number of deer that can be supported in "good" condition may be much lower than the maximum number possible. Some people distinguish "maximum" and "optimum" carrying capacity, the former varying with good and bad years when deer numbers build up and crash, the latter being the relatively stable number of deer that can be supported in good condition on a sustained basis.

Regardless of how carrying capacity is defined, it is a function of the habitat, which provides those things deer require to live and reproduce. Even in the "best" habitat, however, deer numbers do not increase indefinitely. Those things that prevent further growth are termed "limiting factors". These may be food supplies, weather, disease, predation, etc., and they usually act in concert. Thus, a drought (weather) can reduce food supplies, or heavy winter snow can restrict access to food and increase vulnerability to predation. Limiting factors may be different in different areas and habitats, and may differ at different periods in the same area. Hence, the goal of habitat management for deer is to identify the current factors that limit a deer population and design and conduct habitat management projects to address the situation.

There are several important concepts to keep in mind when thinking about deer habitat and how to improve it. Two of the most important are plant succession and spatial scale.

1. Plant Succession

In understanding deer and their habitats, it is often useful to refer to the ecological concept of plant succession. Succession is a process that is initiated following a disturbance of some kind causing a change in vegetation that follows a predictable pattern. Certain plant species or types of species replace or "succeed" each other over time in a predictable fashion. For example, following a hot forest fire that leaves just bare soil, a hillside will soon be dominated by small

herbaceous plants ("forbs" and grasses) and shrubs. These are so-called "early-successional" stages. If left alone for some time, decades or longer, the site eventually may be dominated by trees, a "late-successional" stage. Similar patterns of changes follow other disturbances such as timber harvest or livestock grazing. The particular species of shrubs and herbs will differ across the state, but the process is similar. Management often is designed to alter the pattern of vegetation change following a disturbance to achieve a particular goal.

Succession is important for deer in California, except in very dry areas. Typically early successional stages provide the best deer habitats. Shrubs, which are usually the major component of a deer's diet, typically provide the best nutrition when they are young because they are high in protein and in physical reach of deer. Older shrubs are both poor in nutrition and may have grown too tall for deer to use. Thus, later successional stages, in which trees or old shrubs dominate an area and exclude herbs and young shrubs, often provide poor habitat for deer because they provide few of the nutritious, young plants that allow deer to thrive.

Later successional stages, most notably "old growth," while not important feeding areas for deer, often provide security ("hiding") and thermal cover. We

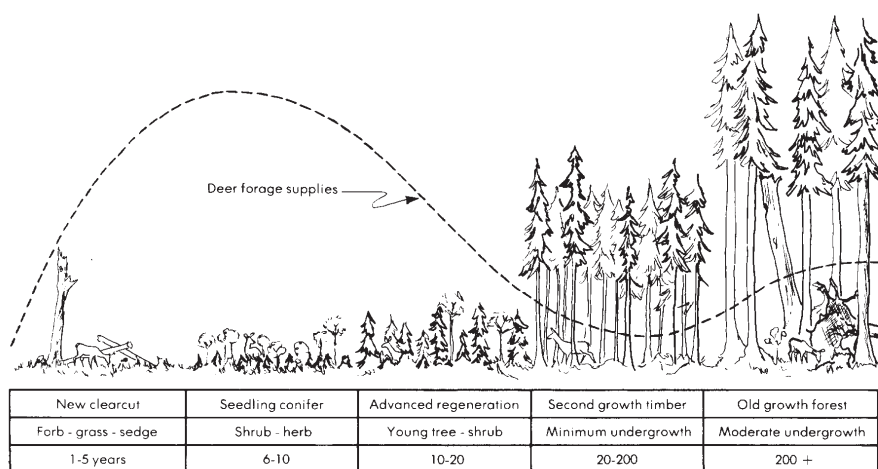


Figure 4. Generalized representation of the relationship between deer forage supplies and the successional process as influenced by timber harvest and plant succession.

Graphic from: Wallmo and Schoen (1981). Forest management for deer. Pages 434-457 in O.C. Wallmo, Ed. Mule and black-tailed deer of North America. Wildlife Management Institute, University of Nebraska Press.



These two photographs were taken from the same U.S. Forest Service lookout tower (Klamath National Forest, Pony Creek), approximately 60 years apart.

Top: Taken in August 1935. Note the amount of early successional vegetation (quality deer habitat) that exists in the area.

Bottom: Photograph is of the same area taken in August 1992. Note that the early successional vegetation has been replaced by conifer stands (poor deer habitat), as a result of succession. This type of habitat change (decrease in the amount of quality deer habitat) has occurred on millions of acres of California's key deer ranges. The result of this declining carrying capacity is lower deer numbers statewide.

Photo by George Gruell

recognize the overall value of these old-growth wildlife habitats, and do not suggest that all of California's wildlands be managed for early successional habitats. However, we do strongly urge that those lands that are managed to produce early or mid- successional stages for various management objectives (e.g., timber or livestock) be managed to enhance habitat quality for deer.

One of the most common and important disturbances affecting deer habitats in California is fire. For tens of thousands of years, fires caused both by lightning and Native Americans burned much of the state, especially chapar-

ral and conifer forests. Many of the plants most favored by deer in these habitats, such as deerbrush, need fire to stimulate their seeds to germinate, or sprout from burned stumps. Early explorers and naturalists described forests of the Sierra Nevada as open and parklike due to frequent, usually low-intensity and relatively cool ground fires.

This has changed dramatically in the 20th century. Policies and practices regarding fire suppression have allowed vegetation in much of the state to succeed to dense, closed-canopy forests and stands of old and decadent chaparral, much to the detriment of deer. Photographs taken at the same place over long intervals of time document these changes. When fires do occur, they are hot, catastrophic wildfires. Following these, forest managers often seek to avoid or minimize the duration of the early successional stages of vegetation by planting conifers and suppressing shrubs with herbicides, which further decreases the value of the habitat for deer.

In areas of low rainfall, such as east-side Sierra Nevada winter ranges, fires may have an extremely detrimental effect on deer habitats. In these dry or desert habitats, fire may kill and prevent the re-establishment of vegetation (e.g., bitterbrush, sagebrush, mountain mahogany) that deer need to survive.

2. Spatial Scale

Another important issue to consider regarding deer habitat is spatial scale. The density of deer in California varies from one deer in tens of square miles in desert environments to tens of deer per square mile in some of the most productive habitat. Typical summer-range densities of migratory deer, however, may be from 2-10 deer per square mile; some non-migratory deer occur at even higher densities. A little arithmetic shows that even a relatively large-scale disturbance, say a 10,000-acre wildfire (about 20 square miles), may affect habitat for a few hundred deer at most. Management activities or disturbances in smaller areas, from several tens to several hundreds of acres, by themselves can have only a small benefit. However, when many small treatments are linked together over time, they can be significant.

Thus, if you want to improve deer habitat in a meaningful way, think big! This can be done either by influencing management on large pieces of land, or by a collection of many smaller projects that together have a large impact. An example of the former would be to require that post-fire rehabilitation practices



Wintering Rocky Mountain mule deer in Round Valley near Bishop, California. Important forage plants are bitterbrush, sagebrush, perennial grasses and annual grasses and forbs. Wildfires in many of these east-side habitats have virtually eliminated the bitterbrush, reducing overall carrying capacity for mule deer.

Photo by Tam Kucera

on an entire ranger district on a national forest allow a flourishing shrub understory to develop. Examples of the latter include rehabilitating all the springs on a B.L.M. Resource Area, replanting 50 acres of winter range each year for 20 years, or reduction of livestock on a series of grazing allotments over time.

In summary, the two most important principles for creating or improving deer habitat in much of California are: 1) in areas with substantial rainfall, introduce frequent disturbances of appropriate types to create and maintain early-successional vegetation; and 2) influence management on an appropriately large scale. The early-successional plant species favored by deer contain the best nutrition; land-management policies that remove disturbance from an ecosystem and allow succession to proceed to later stages often create poor deer habitat. Policies and projects that reflect an isolated, small-scale approach to habitat improvement may be ineffective and a waste of money.

III.

Who Manages Deer and Deer Habitats?

California is complex not only ecologically, but administratively as well. In addition to extensive private land ownership, there is a variety of state and federal agencies whose missions and activities affect mule deer and their habitats. The CDFG estimates that of a total of about 100 million acres in California, there are approximately 64 million acres of deer habitat. Approximately 60 percent of this deer habitat is administered by the federal government, including nearly all the summer ranges of migratory deer. Patterns of land ownership across the state are shown in Figure 6 on page 31.

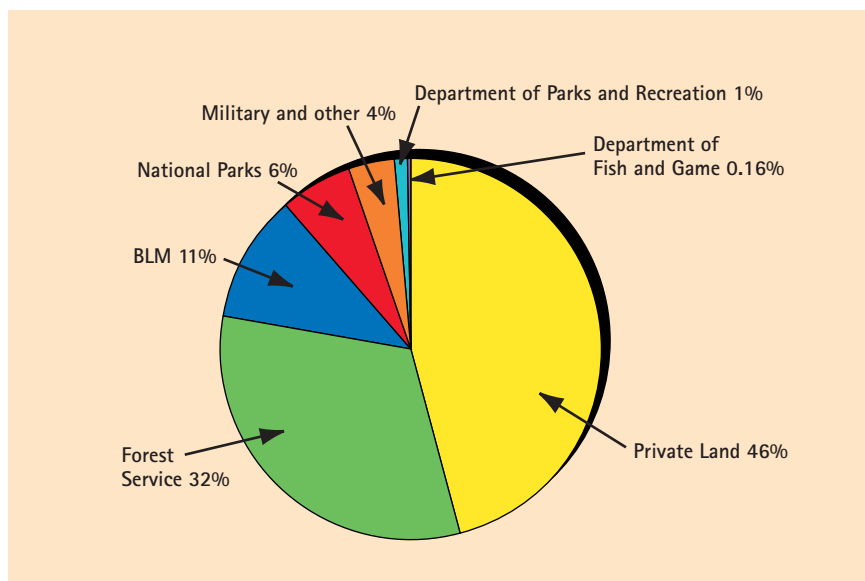


Figure 5. Who's Minding the Habitat?

About 64% of California's 100 million acres is deer habitat. How much of it is managed to benefit deer? The pie chart above, shows the ownership of the state's 63.7 million acres of deer habitat.

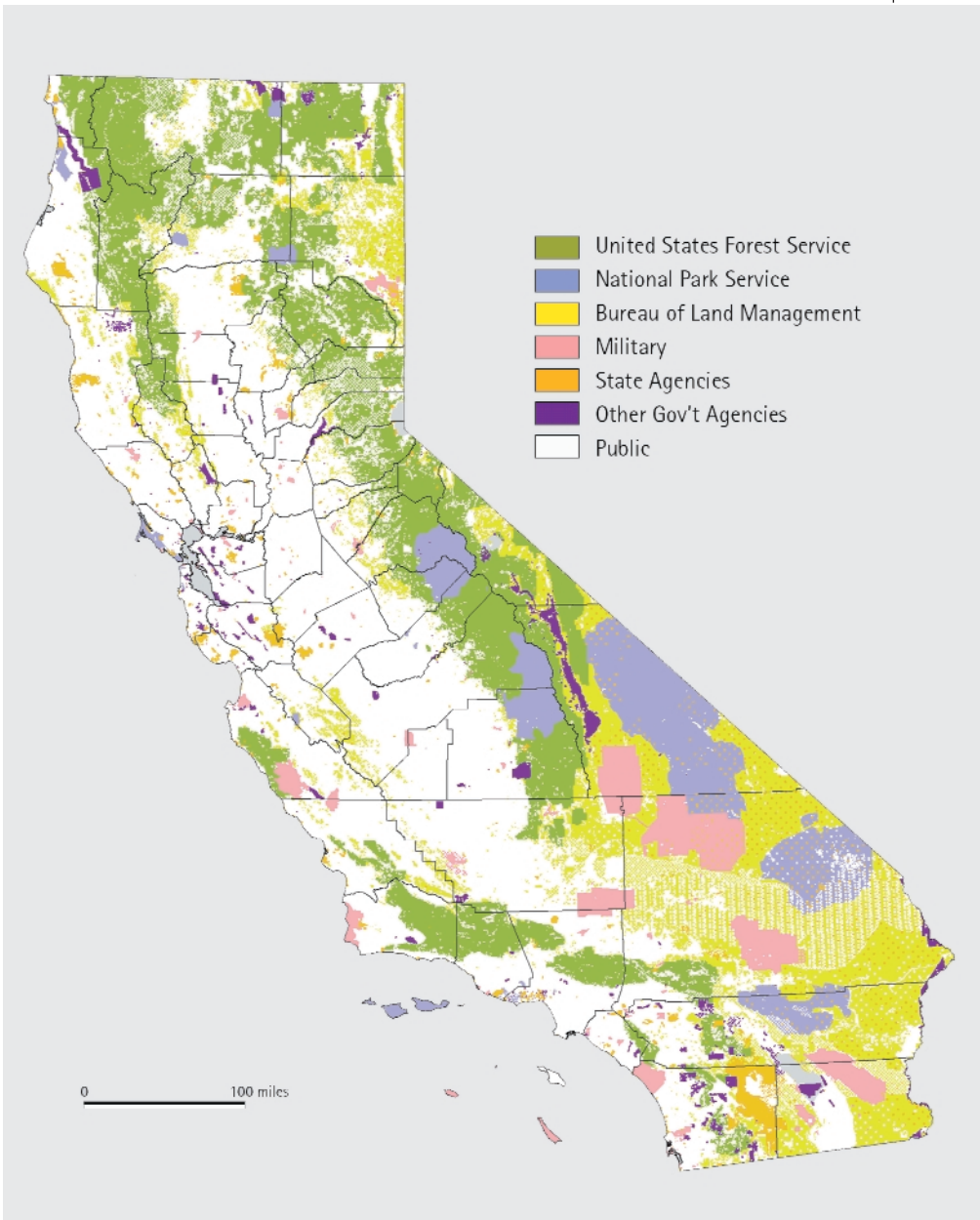


Figure 6. Land Ownership

source: Teale Data Center

To best determine where to put one's efforts in improving deer habitats, it is important to know the "players" in deer management and their roles. The following are the most important.

A. United States Forest Service (USFS)



An agency within the United States Department of Agriculture, the USFS is the largest public land agency in California. About one-fifth of California's approximately 100 million acres, or about 20 million acres, are managed by the USFS. As shown in Figure 5, on page 30, most of these acres are deer habitat. Thus, activities on lands managed by the USFS have enormous implications for California's deer.

In the California region of the USFS (Region 5), there are 18 national forests. These forests extend from the Six Rivers National Forest at the California/Oregon border to the Cleveland National Forest in San Diego County. (See Appendix I on page 86 for a list of the addresses and telephone numbers of USFS offices in California). Each forest is headed by a forest supervisor, who makes decisions on land and habitat management directions for that particular forest based in part on review by a staff of technical specialists, including hydrologists, botanists, and wildlife biologists. National Forests are organized into Districts. Implementation of forest management direction is accomplished at the District level, where the District Ranger and staff conduct field activities.

USFS management actions that may affect deer habitat include timber harvest, road construction, livestock grazing, and revegetation activity following fire or timber harvest (including suppression of "undergrowth"). The USFS has a "multiple-use" mandate, and must by law take all resource uses into consideration when planning management actions.

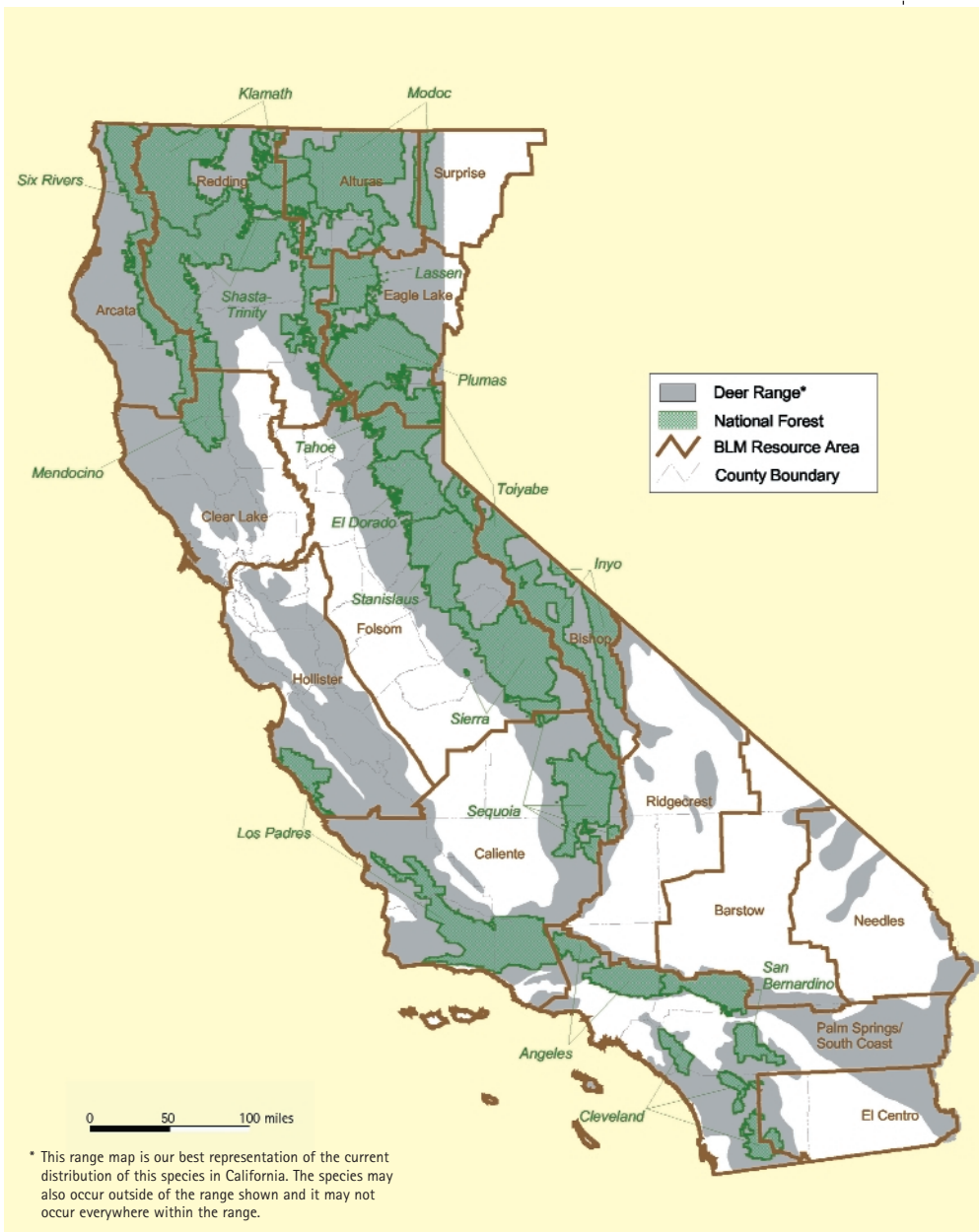


Figure 7. Deer Range, National Forests and BLM Resource Areas

source: Department of Fish and Game

Some of these may benefit deer habitat; some do not. As a federal agency managing public lands, the USFS actions are open to public review and comment. Interested parties may review proposed management actions and suggest alternatives. In the section IV on page 38 of this Guide we discuss how this is done.

B. Bureau of Land Management (BLM)



The Bureau of Land Management is an agency within the U.S. Department of the Interior. It was formed in 1946 to manage what remained of the “public domain” lands after transfer to individuals, states, and national forests and parks. By law, the BLM is required to manage in a way that accommodates many uses of the land, including livestock grazing, timber harvest, mining, and wildlife habitat.

The California State Office of the BLM, headquartered in Sacramento, administers about 7 million acres of deer habitat in California (figures 5 and 6 on pages 30-31). The agency is organized into 14 Resource Areas, from Arcata and Redding to El Centro. (See Appendix II on page 91 for a list of addresses and telephone numbers of BLM offices in California.) The most important BLM activity affecting deer habitat in California is livestock grazing. In addition, timber harvest and mining administered by BLM can have significant implications for deer habitat. Like the USFS, its actions are open for public review and comment; see Section IV on page 38 for a description of this review process.

C. National Park Service (NPS)



An agency within the U.S. Department of the Interior, the National Park Service administers national parks, seashores, and historical monuments that, in California, include more than 3.5 million acres of deer habitat. Compared to other management agencies, NPS conducts little active land management; for example, there is no commercial timber harvest or livestock grazing in national parks. However, policies such as allowing natural fires to burn, programs of controlled burning, and restriction of camping and the use of pack horses in and near meadows can yield very important benefits for deer habitat.

D. Private

About 29 million acres of deer habitat in California, or nearly half of the state's total, are privately owned. These include conifer, hardwood, and shrub habitat types. Large industrial timber companies own about 4 million of these acres. The management of these private lands varies with the economic needs and the wishes of the landowners, from large, industrial forestry concerns to livestock grazing, to hunting clubs, to second homes. CDFG's Private Lands Wildlife Habitat Enhancement and Management Area (PLM) Program is directed toward private landowners, seeking to reward them for improving wildlife habitat on their lands. In addition, private consultants can provide valuable information on deer habitat improvement. A list of private consultants working in this field can be obtained by contacting Wildlife Extension at the University of California, Davis at 530-752-1496.

E. California Department of Fish and Game (CDFG)



The California Legislature formulates the laws regulating the management of fish and wildlife in California. It has delegated authority to the Fish and Game Commission (Commission) to regulate the take and possession of wildlife, for example, to set seasons and bag limits. It is the responsibility of CDFG to carry out the policies of the legislature and commission.

In California, the goals of deer management are to encourage the conservation, restoration, maintenance, and utilization of California's wild deer populations. Deer are managed on a herd basis; that is, single deer herds or groups of herds with similar management and habitat requirements are identified and managed accordingly. Eighty Management plans have been developed for the 111 recognized deer herds. These plans describe the ecological and political settings of the herds, list current problems, and propose solutions. The component of deer herd management plans of most interest to readers of this Guide is the one dealing with habitat.

CDFG is organized into seven regions, with a central headquarters in Sacramento where policy direction and oversight is conducted. Deer management is located in the Wildlife Programs Branch, under the supervision of a Branch Chief, deer program coordinator, specialists, and staff. Policy implementation is accomplished at the regional level. Each region has a Regional Manager, senior wildlife biologist supervisors, and a staff of field biologists. Actual herd management occurs at the regional level. (See Appendix III on page 92 for a list of addresses and telephone numbers of CDFG offices.)

The CDFG has management responsibility for determining and enforcing the season and bag limits for deer hunting. However, CDFG has direct responsibility for less than 1 percent of the state's deer habitat. Thus, because CDFG owns or has direct control over relatively little land, its

ability to affect the health, condition, and total number of deer, is limited. Other entities, especially federal land management agencies, manage the majority of publicly owned deer habitat in California.

F. Counties

Counties own or directly manage little deer habitat. However, counties can and do affect deer and their management directly and indirectly. For example, the implementation of county general plans can result in urban development in deer habitat. California law also gives selected county boards of supervisors veto power over proposed antlerless or either-sex hunts. Historically, these hunts have been controversial in California, but are a common component of deer management throughout the nation. Although antlerless hunts are properly considered population management and not direct habitat management, they can have important habitat implications. An antlerless hunt may be the only way to reduce a deer population to nearer the long-term carrying capacity of its habitat, or to allow overbrowsed vegetation to recover. If you are interested in an antlerless hunt that has been proposed by CDFG, but is being opposed by county supervisors, make your opinions known to the supervisors. Attend board meetings, testify, and write letters supporting the proposal. This is one area where your actions can have an almost immediate impact.

County Fish and Game Advisory Commissions are composed of volunteers appointed by County Supervisors that have an interest in wildlife issues in the county. One of their responsibilities is to direct the expenditure of a part of the monies collected from fines for hunting and fishing violations. These funds can be used to support deer habitat improvement projects. Additionally, they often have significant input on proposed antlerless and either sex deer hunts.