

**California Department of Fish and Wildlife**  
***Draft Conservation Plan for Gray Wolves in***  
**California Part 1**

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## Table of Contents – PART I

INTRODUCTION .....	3
Plan Development .....	3
Plan Goals.....	5
Summary of Historical Distribution and Abundance of Wolves in California .....	6
Legal Status.....	6
Federal Law .....	6
California Law.....	10
KEY ISSUES for WOLF CONSERVATION .....	13
Wolf-Livestock Interactions .....	13
Wolf-Ungulate Interactions .....	14
Wolf Predation on Native Ungulates in California.....	14
Ungulate Population Thresholds .....	15
Habitat Restoration and Improvement.....	15
Wolf Interactions with Other Wildlife Species.....	15
Wolves and Human Safety .....	16
Research Needs on Key Issues .....	17
STRATEGIES TO ACHIEVE PLAN GOALS .....	18
IMPLEMENTATION.....	21
Management Limitations.....	22
Legal Considerations.....	22
Scientific information .....	22
Funding.....	23

## EXECUTIVE SUMMARY

The presence of wolves where they occur in the northern hemisphere is a testament to their adaptability, a sign of nature's wonder by some, and often a source of controversy. Recent expansion of gray wolf populations to Washington and Oregon (and now dispersing wolves to California) have been accompanied by public debate regarding this species' role in the coterminous United States where the species previously existed, and the consequences of the species' return to a much different landscape after 100 years or so of absence.

With this background and in anticipation of this species' return to the state, the California Department of Fish and Wildlife (CDFW) began a planning process for gray wolves' conservation and management. This planning effort addresses important concerns that arrive with the presence of wolves, including conflicts with livestock and the maintenance of adequate prey sources for wolves, other predators, and public use. Lastly, given the controversy associated with this species, it was very important that the planning process produce a source of clear, science-based information relevant for California regarding wolves in the state.

CDFW established a Stakeholder Working Group (SWG) to provide recommendations for this planning process. Members were composed of diverse organizations/interest groups with large constituencies in California covering agricultural, conservation, and environmental and hunting interests. CDFW provided an administrative draft Plan to members of the SWG and selected expert reviewers in early December 2014. Recommendations and comments from these entities were carefully reviewed and considered, resulting in this Draft Conservation Plan for Gray Wolves in California (hereafter Plan) for public review. The Plan consists of two parts; Part I contains brief summaries of the development of the Plan, key issues, goals, objectives, and strategies to achieve Plan goals. Part II contains detailed background on all other aspects of wolf conservation. These two parts include the information, although formatted and organized in a different manner, from earlier drafts. Prior to completing and adopting a final Plan CDFW will review and consider additional comments and recommendations received during public review. An administrative draft of this document was also reviewed by a panel of peer reviewers with expertise and experience in resource management in California, and expertise in wolf, ungulate, and livestock biology/management.

This Plan deals with many of the issues raised by the general public, the SWG, and the mission and authority of CDFW. In sum, this Plan covers key issues and potential actions CDFW believes important to the understanding and future conservation of wolves.

Although CDFW is ultimately responsible for the content of the final Plan, this draft Conservation Plan for Gray Wolves in California is designed to be adaptive and will likely be modified as we learn and understand how wolves inhabit and use the wild landscapes in California.

# INTRODUCTION

## Plan Development

The gray wolf historically inhabited California and there exist some accounts of their occurrence during the 1800s. In 1924, the last known wolf in California was killed in Lassen County. CDFW began to prepare for the possibility of gray wolves coming into California early in 2011 by monitoring the news of their recent expansion in Oregon and Washington and increased numbers throughout the west. It appeared reasonable to anticipate that wolves would eventually come into California given the species ability to disperse. Since 1924, no other wolves were confirmed in California until December 28, 2011 when a wolf entered California from Oregon. This dispersing male wolf was previously radio-collared (identified as OR7) by the Oregon Department of Fish and Wildlife (ODFW) with a global positioning system (GPS) device, which allowed satellite tracking of his locations.

The presence of a wolf in California generated a high level of public interest with major stakeholders (representing livestock interests and environmental and big game conservationists) calling for CDFW to be prepared and have a plan in place for wolf conservation and management. CDFW initiated work by securing a U.S. Fish and Wildlife Service (USFWS) Section 6 grant to fund the development of a gray wolf plan and began organizing major stakeholders into a planning effort that contributed significantly to this document. The two parts of this document are the result of that effort.

Subsequent to OR7 returning to Oregon and establishing a wolf pack, and subsequent to plan development, remote camera images (between August 2014 and May 2015) of what appeared to be wolves were recorded in northern California, however, confirming DNA evidence was not available. In late August 2015, additional trail camera images documented five wolf pups and two adults in Siskiyou County. DNA material found near the site confirmed at least 3 individual wolves, one adult and two pups of the group. CDFW designated this group of wolves as the “Shasta Pack” on August 20, 2015.

The Plan development process began after reviewing similar planning efforts in other western states. The Oregon and Washington wolf conservation and management plans were considered most relevant to the California effort and were developed more recently than those in other western states. CDFW met with stakeholders in early 2012 to commence development of a plan to conserve and manage wolves. After contacting a broad range of interested organizations, the following stakeholder organizations were invited to participate in developing the plan:

- Agricultural Commissioners and Sealers from Modoc, Shasta, Siskiyou, and Tehama counties
- California Cattlemen’s Association

- California Deer Association
- California Farm Bureau Federation
- California Houndsmen for Conservation
- California Outdoor Heritage Alliance
- California Wolf Center
- California Wool Growers Association
- Center for Biological Diversity
- Defenders of Wildlife
- Endangered Species Coalition
- Humane Society of the United States
- Mule Deer Foundation
- Natural Resources Defense Council
- Rocky Mountain Elk Foundation
- Sierra Club
- The Nature Conservancy
- The Wildlife Society
- University of California Cooperative Extension

A formal Stakeholder Working Group (SWG) was established by CDFW and the first meeting was held on February 5, 2013 (Part II). Initially the SWG discussed ground rules and planning and operating principles for the effort to develop the Plan. CDFW established sideboards for the planning effort, and proposed goals for the Plan, which were, and have been, subsequently modified through dialogue with SWG members. Sideboards included:

1. As populations of gray wolves continue to expand within the Pacific Northwest, the potential for additional gray wolves to enter California will increase. This planning effort will include a number of alternatives that address gray wolves within the State and because of this potential the option of planning for a future with no wolves in California is not an alternative in this Plan.
2. The CDFW will not reintroduce wolves from another State or country into California, or introduce wolves in any way (e.g., from a captive bred California population).
3. As a result of human influences and the subsequent changes in the California landscape, there is not sufficient habitat for wolves to be restored to their entire historical range.<sup>1</sup> Consequently, the option of planning for a future with wolves distributed throughout the species historical range or abundance in California is not an alternative in this Plan.

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<sup>1</sup> While some references have been compiled on what may have been historical range for wolves in California, they are based on scant verifiable information.

## Plan Goals

The following goals were developed through the SWG process:

- If, and when, wolves establish in California, seek to conserve biologically sustainable populations of wolves in the State.
- Manage the distribution of wolves within the State where there is adequate habitat, consistent with the sideboards identified above.
- Manage native ungulate populations in the State to provide abundant prey for wolves and other predators, intrinsic enjoyment by the public, and hunting opportunities for hunters.
- Manage wolf-livestock conflicts to minimize livestock losses.
- Communicate to the public that natural dispersal of wolves into and through California is reasonably foreseeable given the expanding populations in the Pacific Northwest. Inform the public with science-based information on gray wolves and the conservation and management needs for wolves in California, as well as the effects of having wolves in the State.

As part of the Plan development process, the full SWG met on 12 occasions. The SWG also formed the following five subgroups:

- Operating principles (met one time)
- Conservation objectives (met nine times)
- Wolf-livestock interactions (met 13 times)
- (Conservation objectives and Wolf-livestock interactions subgroups met jointly two times in addition to above totals)
- Wolf-ungulate interactions (met six times)
- Funding (met one time)

CDFW asked these subgroups to explore the available information in these subject areas and assist in developing recommendations for inclusion in the Plan to address the issues. Although CDFW was clear that it is responsible for content of the final Plan, the SWG was provided opportunity to make substantive contributions for CDFW to consider. In particular, CDFW assured the SWG that any recommendations on conservation objectives or management strategies that attained consensus by the full SWG would receive priority consideration by CDFW. Consensus was defined to mean that all parties supported, or could live with, the particular objective or strategy. The complete Operating Principles for the SWG are located in Part II.

Throughout Plan development, the subgroups engaged in joint fact-finding, reviewed drafts of management strategies, and assisted development of the Plan. Subgroups and the full SWG reviewed multiple versions of most Plan content and contributed to its development. CDFW provided the first comprehensive draft to the full SWG in early December 2014.

Available information on historical distribution, abundance, and ecology of wolves in California is limited and the California landscape is much different than it was when wolves historically inhabited the state. Given the limited availability of California-specific data regarding the consequences of wolves becoming established in the state, this Plan relies in part, on information from other locations, while recognizing there may be uncertain or limited application to current and future conditions in California. Therefore, the information included in this Plan should be viewed as preliminary and subject to revision once data specific to California are obtained. In developing this Plan, CDFW amassed a large volume of literature review on wolves, background on ecological/biological and human interactions with wolves, and the relevant information to California's wolf history. Because of its volume, CDFW restructured the Plan to this draft final format to more efficiently identify conservation actions (Part I) and separate them from supporting information (Part II).

## **Summary of Historical Distribution and Abundance of Wolves in California**

The available information on wolves in California is largely anecdotal and indicates that wolves occurred in the state; however an accurate representation of their historical distribution and abundance cannot be determined. Some of the anecdotal observations were ambiguous as to whether the observer was reporting a wolf or a coyote, and physical specimens were few in number. Most California native peoples had a word for wolf in their vocabularies, as well as for coyote and dog, and some incorporated wolves into their stories and rituals. This information is consistent with the acknowledgement that wolves occurred in the state. Additional discussion on this topic can be found in Part II.

## **Legal Status**

### **Federal Law**

Gray wolves were originally listed as subspecies or regional populations of subspecies in the contiguous United States and Mexico under the U.S. List of Endangered Fish and Wildlife of the federal Endangered Species Act (ESA). In the Great Lakes region *C. l. lycaon* was listed in 1967, in the northern Rocky Mountains *C. l. irremotus* was added to the List in 1973, and in the southwest the Mexican gray wolf subspecies *C. l. baileyi* was added in 1976. In 1978 subspecies listing was removed, and the gray wolf was listed as an endangered population at the species level throughout its range in the contiguous United States and Mexico, except Minnesota where it was listed as threatened. Between 2003 and 2009, the United States Fish and Wildlife Service (USFWS) published several rules in an attempt to revise the 1978 listing for *C. lupus* in the contiguous United States and Mexico to reflect the biological recovery of gray wolves in the northern Rocky Mountains



and western Great Lakes regions, while continuing to recognize the endangered status of wolves in the southwestern U.S. and Mexico (except for the nonessential experimental population in Arizona and New Mexico). Each of these published rules was challenged in court and, as a result, *C. lupus* remains listed at the species level with the exception of the three experimental populations in Yellowstone National Park, central Idaho, and the southwest, which are identified as “nonessential experimental” populations.

In 2012, the USFWS concluded a five-year review of the *C. lupus* listed entity, which included an evaluation of the status of gray wolves currently occupying portions of the Pacific Northwest, including Washington and Oregon, and the southwest, including Arizona. In 2013, USFWS published the results of their review in the Federal Register, titled “Removing the Gray Wolf From the List of Endangered and Threatened Wildlife, and Maintaining Protections for the Mexican Wolf by Listing it as Endangered.” Their proposed rule included removing the current *C. lupus* listed entity because, based on their review, it was not a “species” as defined by ESA. Instead, their conclusion was that wolves occupying the historical range of the gray wolf subspecies, *C. l. nubilis* (“plains” wolf), are widespread and exist as large, stable populations. For the subspecies *C. l. occidentalis* (northern timber wolf), USFWS concluded that threats that historically led to severe range contractions will not lead to further contractions, and the subspecies’ range is now stable or expanding. As a consequence those subspecies are not in danger of extinction throughout their ranges, and therefore do not meet the definition of an endangered species. The 2013 proposed rule further concluded that the Mexican wolf subspecies, *C. l. baileyi*, based on the best scientific information available, is in danger of extinction throughout all of its range and therefore warrants listing as endangered under ESA. At the time of this writing, USFWS has concluded their review of the 1.6 million comments they received in response to their proposed rule but have yet to issue a decision.

Under ESA it is unlawful to “take” any listed wildlife unless authorized by regulation or permit (50 CFR 17.21). The term “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or to attempt to engage in any such conduct. Harass is further defined as “an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering” (50 CFR 17.3).

### *Northern Rocky Mountains*

The *Northern Rocky Mountain Wolf Recovery Plan* was completed in 1980 and revised in 1987. In that document, “northern Rocky Mountain wolf” refers to gray wolves occurring in the Northern Rocky Mountains (NRM) of the contiguous United States, rather than to a specific subspecies. Therefore Washington, Oregon, and California were not included in that plan. The primary objective of the plan was “To remove the Northern Rocky Mountain wolf from the endangered and threatened species list by securing and maintaining a minimum of 10 breeding pairs of wolves (defined as two wolves of the opposite sex that mate and produce offspring) in each of three recovery areas for a minimum of three

successive years.” A population of this size would be comprised of approximately 300 animals. The three recovery areas specified were the Greater Yellowstone Area, central Idaho, and northwestern Montana. The plan recommended natural recovery in Montana, and Idaho. Further, it recommended the use of ESA’s section 10(j) authority to establish a nonessential experimental population of wolves in Yellowstone National Park, and a second one in Idaho should that recovery area fail to have two breeding pairs resulting from natural recolonization by 1992.

In 1994, NRM recovery goals were modified within *The Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho* Environmental Impact Statement. This document represented a proposal to establish an experimental population rule that would allow management of wolves by government agencies and the public to minimize conflicts on public lands, effects on livestock, and impacts on native ungulate populations. The Final Rule for the reintroduction was published in November 1994, and in 1995-1996, 66 wolves were captured in Alberta and British Columbia, Canada; of these, 35 were released into central Idaho and 31 were released into Yellowstone National Park. These populations expanded during the ensuing years such that by 2002, recovery goals in the NRM were first met. In 2011 the USFWS published a Final Rule that identified the NRM Distinct Population Segment<sup>2</sup> (NRM DPS) and removed gray wolves in the DPS from the endangered species list except in Wyoming. That Rule was overturned in court; however Congress, using a rider to a Defense and Budget bill, instructed the USFWS to re-issue it. Wyoming wolves were removed from the list in 2012, but a court decision in 2014 reinstated the endangered species status. In addition to the growing wolf populations in Wyoming, Montana, and Idaho, wolves were expanding their range into eastern Washington and Oregon. These populations were included in the 2011 delisting of the NRM DPS. As a result, wolves in the western two-thirds of Oregon and Washington (as well as throughout California) continue to remain federally endangered pending the USFWS’s decision on its 2013 Proposed Rule as discussed above.

### *Southwestern United States and Mexico*

The Mexican wolf is believed to be the rarest and most genetically distinct subspecies of gray wolf in North America. As previously mentioned, this population was added to the endangered species list in 1976. Between 1977 and 1982, the USFWS and the Mexican Department of Wildlife initiated a bi-national captive breeding program, the purpose of which was to provide animals for future reintroduction into the wild. This effort was deemed necessary due to the lack of a viable free-ranging source population for reintroduction as was available for the other recovery areas in the U.S. The *Mexican Wolf Recovery Plan* was approved by the USFWS in 1982 and is currently being revised. Recovery goals were not established in the Recovery Plan due to the uncertainty of the captive breeding program’s outcomes, and the potential that delisting the subspecies may never be

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<sup>2</sup> A DPS (Distinct Population Segment) is a discrete subgroup that is the smallest division of a species permitted for protection under the federal ESA. The NRM DPS is a DPS of the gray wolf that occurs throughout the states of Idaho, Montana, Wyoming, the eastern one-third of the states of Washington and Oregon, and a small part of north-central Utah.

possible. The primary objective of the Recovery Plan is “To conserve and ensure the survival of *Canis lupus baileyi* by maintaining a captive breeding program and re-establishing a viable, self-sustaining population of at least 100 Mexican wolves in the middle to high elevations of a 5,000-square mile area within the Mexican wolf’s historic range.”

Through the 1980s the Mexican wolf captive breeding program proved to be increasingly successful. Consequently, the Final Environmental Impact Statement on *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States* was completed in 1996, and the USFWS published its Final Rule in 1998 establishing a nonessential experimental population in Arizona and New Mexico. In 1998, 11 captive-reared Mexican wolves were released into the Blue Range Wolf Recovery Area. The population has expanded slowly relative to the reintroduced population in the NRM. In January 2015, the USFWS finalized their proposed rule to revise the Mexican Wolf Experimental Population. The revised rule lists the Mexican wolf as an endangered subspecies, as opposed to being listed under the full gray wolf species (*C. lupus*)

### *Federal Status in California*

As a result of the sequence of actions described above, the current gray wolf listed entity includes all or portions of 42 states. Wolves occurring in eastern Washington and Oregon are considered to be within the delisted NRM DPS. However, the entirety of California is included among the 42 states in which the gray wolf is still federally listed, and any wolves dispersing into northern California from Oregon are protected as federally endangered under ESA. Similarly, any wolves dispersing into Southern California from the Mexican Wolf Experimental Population Area in Arizona are also protected as endangered under ESA.

Wolves that enter California are protected by the ESA, which is administered and enforced by the USFWS. On June 13, 2013, the USFWS proposed to remove the gray wolf from the federal list of endangered and threatened species but to maintain endangered status for the Mexican wolf by listing it as a subspecies (*C.l. baileyi*). This action may result in gray wolves in California being removed from federal protection under the ESA. Neither the timeframe for a decision on this matter by the USFWS, nor the nature of the decision, is known at this time.

CDFW has a cooperative agreement with the USFWS, under Section 6 of the ESA. This provides CDFW authority to manage for the conservation of federally endangered or threatened species, including wolves, within California. However, the agreement does not authorize lethal take of endangered species. If the wolf is down-listed to threatened status, CDFW may have greater latitude for management of the species. If wolves are removed from the federal list of threatened and endangered species, management authority will revert entirely to the state. There are no federally mandated population goals for gray wolf recovery in California at this time.

## California Law

### ***The California Endangered Species Act***

The California Fish and Game Commission (Commission) listed the gray wolf as an endangered species under the California Endangered Species Act (CESA) on June 4, 2014. (The California Endangered Species Act, including related definitions and other relevant statutory provisions are included in as an appendix in Part II for reference.)

Once a species is listed, CESA provides that,

*“No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof..., or attempt any of those acts, except as otherwise provided in this chapter...” (Fish and G. Code, § 2080.)*

CESA further provides that it is “the policy of this state that all state agencies, boards, and commissions shall seek to conserve endangered species and threatened species and shall utilize their authority in furtherance of the purposes of this chapter.” (Fish and G. Code, § 2055.).

CESA does not provide for preparation of recovery strategies, other than for one aquatic species. While this Plan does contain some of the same elements that federal recovery plans contain, for reasons explained in this chapter and elsewhere in the Plan, CDFW does not believe existing information is yet sufficient to articulate what a “conserved” condition for gray wolves means in California. CDFW does not assume that wolves will inevitably occupy all habitats that appear suitable, or eventually achieve a population status that will warrant delisting under CESA. The available scientific information is not yet sufficient to predict with confidence where wolves will inhabit California, or how many wolves that habitat will support over the long-term.

### ***Take under CESA***

One specific implication of listing under CESA is that “take” of a wolf is prohibited, except in a few limited circumstances (See e.g. Fish and G. Code, §§ 2081 and 2835.). “Take,” as defined in Fish and Game Code section 86, means to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” CDFW may issue a permit to authorize take of listed species that would otherwise be prohibited if it is for a scientific, educational or management purpose. (See Fish and G. Code § 2081(a).). CDFW may also issue a permit for take that is “incidental” to an otherwise lawful activity, where impacts are minimized and fully mitigated and adequate funding is ensured. (See Fish and G. Code § 2081(b).) Similarly, CDFW may issue permits for take of species that are “conserved and managed” as part of large scale Natural Community Conservation Planning efforts pursuant to Fish and Game Code section 2835. In no event can CDFW issue a take permit under these programs if the proposed activity would jeopardize the continued existence of

the listed species. (See Fish and G. Code § 2081(c)) and as long as the gray wolf remains listed under federal law, a federal permit is required before CDFW may issue any type of take permit under State law.

### ***Future Review of Gray Wolf Status***

Fish and Game Code section 2077 requires CDFW to “review species listed as an endangered species or as a threatened species every five years to determine if the conditions that led to the original listing are still present”. Based on the above, this review is scheduled to occur in mid-2019.

Under CESA, a species may be delisted as endangered or threatened if the Commission determines that its continued existence is no longer threatened by any one or any combination of the following factors:

- Present or threatened modification or destruction of its habitat
- Overexploitation
- Predation
- Competition
- Disease
- Other natural occurrences or human related activities

Although other western states’ wolf plans proposed demographic criteria to trigger the commencement of delisting from state or federal endangered species laws, CDFW is not proposing delisting criteria at this time. As previously stated, existing information is not yet sufficient to articulate what a “conserved”, condition for gray wolves means in California. Sufficient information to support development of delisting criteria may be available near the end of Phase 2, or in Phase 3, as described in later sections of the Plan. At that time, relevant data on the pace of wolf establishment, population growth, distribution, and mortality will be available and useful for determining whether the provisions of CESA remain necessary, or to project the conditions under which they will remain necessary in the future. It is possible that CESA’s protections may be necessary for quite a long time to maintain what may be a small future population of wolves in California.

### ***Other State Law and Policy***

As the designated State government entity with trustee responsibility for fish and wildlife resources, CDFW has adopted a mission statement as follows:

*“The Mission of the Department of Fish and Wildlife is to manage California’s diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.”*

This broad direction for CDFW is further guided by particular statutes in the Fish and Game Code. CDFW's two-pronged mission that requires management of resources for both ecological values, as well as for use and enjoyment by the public, reflects legislative guidance found in numerous places in the Fish and Game Code (See e.g., Fish and G. Code, §§ 1801 and 1802.). Wolves present a challenge to CDFW, as trustee for all wildlife, to accomplish the various policy objectives in the Fish and Game Code. In particular, the relationship between wolves as predators and their ungulate prey will be controversial.

CDFW is charged with conserving wolves in California, and also managing for biologically sustainable populations of other wildlife species, including ungulates such as elk and deer. In the context of this Plan, management related to wolves is regarded as managing the species habitat for conservation, and managing wolves and their prey to successfully conserve both.

CDFW recognizes there may be challenges in managing for new recolonizing, small populations of elk in ranges where wolves may become resident. Further, there is a reasonable concern over predictable depredation of domestic animals, primarily livestock, by wolves as the population expands.

The direction contained in the Fish and Game Code to manage for "biologically sustainable populations" is a key consideration in developing this plan. CDFW anticipates that wolves will become re-established in California. Wolves are highly mobile and capable of emigrating from other western states, most likely from Oregon, and finding suitable habitat where it exists in California. Colonizing animals have and will establish packs<sup>3</sup> and reproduce. Although some pups may not survive their first year particularly from first time breeders, subadult animals will disperse from their natal packs to search for mates and establish new packs. At this time, CDFW cannot predict how large a wolf population California will support. Although some wolves are now present, the future for these individuals is unknown. CDFW can learn from the wolf recovery experiences in other western states and design a plan that adapts its wolf conservation over time; and relies on the best available scientific information as it becomes available.

Fish and Game Code statutes guide this plan. CDFW's mandate is to manage this species with the goal of bringing wolves to a point where listing under CESA is no longer warranted. However, there is uncertainty about the future distribution and abundance of wolves in California. The landscape has changed significantly since wolves last inhabited this state. In 1920, shortly before wolves were extirpated in California, the human population was 3.4 million. Currently the population is about 38 million. Related human-generated development and activity has decreased habitat suitability for most wildlife species, and this trend is likely to continue.

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<sup>3</sup> For purposes of this Plan, a wolf pack is defined as two or more wolves traveling together and using a definable area.

## **KEY ISSUES for WOLF CONSERVATION**

A successful conservation effort for wolves in California requires a focus on a number of key conservation issues. The SWG meetings and CDFW's plan development reflected this reality. First and foremost, large landscapes of suitable and non-fragmented habitat capable of supporting wolves and their primary prey are needed. This priority is not dissimilar from the habitat needs of hundreds of California wildlife species and is a basic tenet in any species conservation plan. CDFW, other public agencies, and private landowners will now need to consider potential effects on the gray wolf from proposed land management activities. In addition to this fundamental conservation issue, the CDFW and SWG identified four key issues that are considered most significant for the future of wolf conservation: 1) wolf-livestock interactions; 2) wolf-ungulate interactions; 3) wolf interactions with other wildlife; and, 4) wolves and human safety concerns. These four issues are addressed below and conclude with a statement of future research needs.

### **Wolf-Livestock Interactions**

#### ***Potential Effects of Wolves on Livestock and Herding/Guard Dogs***

CDFW and the SWG thoroughly analyzed the potential impacts of wolves on livestock (Part II). Wolf interactions with livestock are considered to be most likely in the Cascade Range and Modoc Plateau areas. Should wolves establish in the Klamath Mountains area, they may be less likely to interact with and adversely affect livestock because the range is generally steeper topography and more densely timbered than much of the Cascade Range and the Modoc Plateau, and at the landscape level, the range is not as productive for livestock. Consequently, beef cattle and sheep densities are higher in the Cascade Range and Modoc Plateau than the Klamath Mountains (Part II).

Although livestock losses from wolves in California would be expected to occur on large ranches and public land grazing allotments, wolf-related losses may also occur on smaller parcels in rural-residential areas. Many Californians reside in such areas, often located on deer winter ranges and/or adjacent to public land or private forest and range lands. In addition to cattle and sheep, livestock may include horses, goats, llamas, and donkeys, and depredation by coyotes, mountain lions, and black bears is not uncommon.

Wolves have sometimes killed domestic dogs used for livestock protection, particularly those guarding sheep from predators in remote locations. Herding dogs face similar risks, although they are often working with a herder, who may serve as a deterrent to wolves attacking dogs. Success of livestock protection dogs has varied when employed for protection against wolves, although there is ongoing research to determine if some larger European dog breeds may be more effective than more commonly used breeds in the western United States.

Based on information from the western states, wolf depredation on dogs is anticipated to be a rare occurrence in California. Working dogs associated with livestock appear to be more effective and less at risk from wolves when an adequate number of dogs per herd are present, and with the presence of trained herders. However, this higher vigilance would result in increased costs to livestock producers. Working dogs and trained herders may be more effective for protecting sheep flocks than protecting cattle.

Attempting to predict the effects of wolves on California livestock and dogs will be limited by many uncertainties. For example, it is difficult to predict how often wolves might interact with livestock, the livestock husbandry practices that may be used in certain areas, the likely ratio of detected vs. non-detected mortalities by area, and the anticipated improvements in livestock protection measures employed by both livestock producers and wildlife managers.

## **Wolf-Ungulate Interactions**

### **Wolf Predation on Native Ungulates in California**

The best available scientific information suggests that, generally, wolf preferentially prey on elk populations when present, and on deer in the absence of elk. Because of this, and the small, but growing populations of elk in northern California, and depressed deer populations since the 1970s, there is concern that wolves could significantly affect prey populations. Significant effort, funding, and time has been expended to enhance and re-establish both elk and deer populations in California in recent decades. These efforts have been funded through sales of hunting licenses and tag fees, and cost-sharing with landowner and non-government organizations.

Prey selection by wolves in California will most likely consist of Roosevelt elk and black-tailed deer in the northwestern part of the state, and of Rocky Mountain elk and mule deer in northeastern California (Part II). Predation on pronghorn antelope is not anticipated to be significant and predation on bighorn sheep will not likely occur because of the far distance to the nearest Sierra Nevada bighorn population. Non-native feral animals such as wild horses and burros could be preyed upon by wolves in northeastern California. There is concern that wolf predation has the potential to significantly impact and possibly extirpate local populations of prey. CDFW assessed the available information regarding wolf predation rates on ungulates in the west to provide some predictive measure of this interaction for California (Part II).

In California, elk distribution is patchy throughout their range, with large areas of unoccupied suitable habitat. This includes the small groups or subpopulations of Rocky Mountain and Roosevelt elk that have become established since the 1980s and have been slowly increasing and expanding within their historical range. Tule elk, which occur further south, could become vulnerable to predation due to their small scattered herds if wolves were to move significantly further south and inhabit tule elk range.



## **Ungulate Population Thresholds**

California's low numbers of elk compared to other western states, and their patchy distribution, and the long-term declining trend in the deer population, causes some concern about the anticipated impact from wolves because of possible population declines in the elk, and resulting decreased prey availability for wolves. CDFW and the SWG identified an initial set of thresholds which when met, would initiate a management response to the extent that management actions are available (Part II). CDFW will monitor ungulate populations that are considered most susceptible to impacts from wolf predation. If CDFW detects a negative impact on elk or deer numbers within a population unit, focused discussions of causes and feasible solutions to reduce the impact will be needed. Options will include improving habitat conditions and managing specific causes of ungulate, especially elk, mortality as previously discussed.

## **Habitat Restoration and Improvement**

Successful conservation of the gray wolf in California will require conservation and management of their prey, which in turn, are reliant on high quality early successional habitats. Healthy and abundant prey populations are important for maintaining public use and enjoyment opportunities. A challenge for California will be to maintain or improve ungulate populations capable of supporting large carnivores by increasing habitat quality on forest and rangelands that are private land or are administered as public land by federal land management agencies.

Ungulate populations require adequate habitat to meet their year-round requirements. Deer and elk are generally most abundant in early successional forests and oak woodlands seasonally, but these habitat types have declined in many areas of California due to fire suppression, reduced timber harvest (see Part II), land conversion to other intensive agriculture and development, and other causes. CDFW's deer and elk programs continue to work with other public land agencies, private landowners, non-governmental organizations, and tribal governments to cooperatively manage habitats for the benefit and enhancement of ungulates. These efforts include management actions to maintain, restore, and improve forage and water quantity and quality, enhance key habitats such as mountain meadow and aspen communities, maintaining oak woodlands, and protecting important wildlands through landowner agreements (e.g., Private Lands Management Program (PLM)). The greatest landscape-scale opportunities to improve habitat and populations for ungulates, and consequently wolves, would occur on significant acreages of lands administered by the U.S. Forest Service and Bureau of Land Management (see Part II).

## **Wolf Interactions with Other Wildlife Species**

When wolves become established in California, their populations will potentially affect species other than their primary prey (elk and deer), or wolf populations may be affected

by competitors (e.g., mountain lions, coyotes or black bears). CDFW evaluated interactions of wolves with other wildlife (Part II) and determined it is desirable to improve our understanding of the baseline conditions and relative abundances of other carnivores that wolves would be considered most likely to interact with or affect. These species are the mountain lion, black bear, and coyote which are considered to be common or abundant species in California. While CDFW does not have population or density data on these species (with the exception of black bear population estimates) there is not, at this time, an anticipated effect of wolves on any of them that would require a need for management intervention.

Monitoring of wildlife communities (with an emphasis on areas with special status species) is needed in areas occupied by wolf populations to determine potential direct and/or indirect effects on species population trends, habitat conditions, and potential changes in predator communities. CDFW would assess, on a case by case basis, effects on declining or vulnerable species should wolves expand to areas of the state occupied by these species.

## **Wolves and Human Safety**

Wolves generally fear people and rarely pose a threat to human safety. Consequently, attacks on humans by wolves are quite rare compared to other species. CDFW evaluated human safety and human perception about wolves (Part II). Worldwide, conditions under which the majority of wolf attacks on humans (resulting in both injury and/or death) can be summarized as follows:

- Wolves afflicted with disease (principally rabies) (Europe, Russia, and Asia);
- Wolves suffering from starvation or other health-related conditions;
- Human guarding of livestock (typically children) where conditions have deprived wolves of wild prey (India);
- Wolf defense of territory and den sites (with pups present) typically from domestic dogs;
- Wolf habituation<sup>4</sup> to humans; and,
- Wolves exhibiting defense behavior associated with food source, when cornered or trapped.

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<sup>4</sup> Habituation is defined by Geist (2007) as “animals’ decreased responsiveness to humans due to repeated contact” and suggests that habituation could lead to taming of wildlife often as a result of positive reinforcement through food. The author cautions that this is often when unpredictable behavior from wildlife may occur and compromise human safety.

Unregulated garbage dumps are well known to attract predators (food conditioning) and to result in increased risk to negative human-wildlife interactions. Wildlife including wolves attracted to this alternate food source may over time become habituated to human presence thereby bringing wolves and humans in closer proximity than what would occur naturally (AMOC and IFT 2005).

Activities in California where humans are most likely to interact with wolves include recreation (e.g., camping, hiking, hunting, fishing, wildlife viewing) and forest and rangeland work (e.g., timber harvesting, fuel reductions, livestock grazing, and rural agricultural activities). In some situations, wolves seasonally follow migrating ungulate herds, which they rely on for food, but it is unknown yet whether wolves in California would exhibit this behavior. Most interactions between wolves and the public will likely consist of memorable observations.

## **Research Needs on Key Issues**

Research and monitoring efforts will rely on available funding and the ability to secure future funding opportunities. CDFW anticipates that these activities will be conducted in collaboration with other state and federal agencies, universities, and other scientists/investigators.

In terms of overall conservation of wolves, one key need is additional first-hand research on habitat suitability in California. CDFW has applied existing habitat models for wolves in the state, but the results are speculative in the absence of data on wolves in the state. (Part II contains a more detailed discussion of potential habitat suitability). However, three regions of California are most likely to provide habitat sufficient to support wolf populations: 1) the Klamath Mountains and portions of the Northern California Coast Ranges; 2) the southern Cascades and portions of the Modoc Plateau and Warner Mountains; and 3) the Sierra Nevada. These represent the geographic areas for which additional research on the key issues would be relevant.

*Wolf-livestock interactions.* While research is ongoing in the west regarding the success of existing practices to reduce or eliminate wolf-livestock conflict, and on new technologies to avoid or reduce wolf depredation on livestock, further research on how the techniques can be applied in California will be needed. Efforts for California will require funding and a coordinated approach among livestock producers, resource agencies, researchers, and non-governmental organizations (NGOs) to design, deploy, and monitor future practices. During and after the collection of monitoring information, collaboration will be needed to make necessary changes to reduce wolf-livestock conflicts.

*Wolf-ungulate interactions.* Resource assessment for ungulates is a priority independent of this Plan, but in relation to understanding wolf effects, will need to be expanded to include information such as; deer and elk abundance and distribution, habitat use and selection, fertility and birth rates, fawn:doe (deer) and calf:cow (elk) ratios, and predation and other mortality sources and rates. Understanding of wolf predation influence on deer and elk population trends is needed.

*Wolf interactions with other wildlife.* Surveys and monitoring to assess distribution and abundance of existing predators in California will need to be gathered to determine what effect wolves will have on the dynamics of these species and whether wolf predation on deer and elk may be additive or compensatory in those areas predicted to overlap with newly expanding wolf presence.

*Wolves and human safety.* Addressing human safety issues will require CDFW to develop information/education products and literature to inform and provide recommendations to the public to avoid encounters with wolves. Many are currently available on state (including CDFW) and federal wildlife agency websites.

## **STRATEGIES TO ACHIEVE PLAN GOALS**

Currently, wolves in California are both federally and state listed under the respective endangered species acts. This legal status controls decisions about, and implementation of, management strategies. The presence of gray wolves in California is a recent event, and while much is known about gray wolves elsewhere in their range, there is limited ecological information for this species in California. Therefore, implementation of any of the strategies defined below must always reflect the legal status of wolves at any given future moment in time, and be responsive to potential differences in how their effectiveness might differ in this state.

Within this section, CDFW identifies strategies and specific actions to implement conservation and management actions for wolves in California. The following priority actions are identified even though the degree and timing of their implementation by CDFW and partner organizations may be influenced by availability of personnel, as well as fiscal and legislative constraints. The SWG identified a number of other specific actions to conserve wolves in California; these are detailed in the appendices.

### **Strategy 1 - Assess and monitor California's wolf population**

- a. Identify field activities and data needs to determine key population parameters. These activities are likely to include monitoring via trail cameras, or scat/hair collections; and could include wolf capture and collaring with satellite transmitters. Sufficient monitoring is needed to assess the status of wolves relative to phasing actions identified in Part II.
- b. Collect and compile reported wolf sightings in California. Determine where follow up is necessary for verification.

### **Strategy 2 - Assess and address threats to wolf conservation**

- a. Identify specific diseases and the risk factors that pose a health threat to people, wolf populations, or domestic animals.
- b. Investigate wolf mortalities to determine important natural and anthropogenic causes of death in California wolves.
- c. Minimize wolf mortality from accidental killing.
- d. Minimize disturbance at active wolf den and rendezvous sites.

Strategy 3 – Protect and manage habitats and manage native ungulate populations to provide abundant prey for wolves and other predators, for their intrinsic value as well as use and enjoyment by the public

- a. Monitor ungulate population parameters and identify thresholds at which some actions may be warranted. If ungulate population fall below identified thresholds, reduce identified causes of mortality.
- b. Increase habitat conditions on a landscape scale to support robust ungulate populations.
- c. Increase coordination and collaboration with large public land management agencies (USFS, BLM) to implement habitat practices that protect, promote, enhance, and most importantly maintain early seral vegetation types.
- d. Increase efforts to provide large landscapes of suitable and non-fragmented habitat capable of supporting wolves and their primary prey.
- e. Consider translocation of elk into former habitat to enhance their populations.

Strategy 4 - Manage wolf-livestock conflicts to minimize livestock losses

- a. Establish and formalize “co-existence” working relationships between affected publics and CDFW that fosters the sharing of information and working relationships, beginning with county wolf advisory groups in the northern counties of Modoc, Siskiyou, and Lassen.
- b. Provide non-lethal depredation assistance to livestock producers by encouraging the deployment of non-lethal practices to prevent, reduce or eliminate conflicts between wolves and livestock.
- c. If data are available, provide timely information regarding wolf activity in the vicinity of livestock production.
- d. Develop a state-managed livestock/wolf program, which could provide compensation for depredation or investment for non-lethal practices. This would require statutory authority and funding to implement.

Strategy 5 - Develop outreach with affected and interested publics

- a. Inform all CDFW employees who may interact with the public, so they can provide accurate and consistent information about wolf conservation and management, and CDFW’s related activities.
- b. Inform the public, the Executive Branch and its agencies, and the Legislature of the presence of wolves in California, their historic place in and value to the ecosystem, and the likely consequences (both positive and negative) of their return.
- c. Inform livestock producers and outdoor recreationists in particular to prevent or reduce the likelihood of conflicts with wolves.

Strategy 6 - Manage wolf-human interactions to reduce human safety concerns, prevent habituation of wolves, and decrease the risk of conflicts between domestic dogs and wolves

- a. Provide recommendations to the public to avoid close encounters with wolves and prevent wolves from becoming habituated.
- b. Provide recommendations to the public about appropriate actions to discourage wolf presence if a close encounter occurs.
- c. Develop informational materials where wolves and humans (and their dogs) may interact to minimize conflicts.

Strategy 7 - Conduct scientifically-based surveys of California's diverse public to gather information about the public knowledge about wolves, understanding of conservation issues, and attitudes about wolves and ungulates

- a. Conduct follow up surveys to measure potential changes in public attitudes to adapt efforts to better meets outreach needs.

Strategy 8 – When evident, manage conflicts between wolves and state and federally listed/candidate species

- a. Monitor populations of wildlife species that are special status species in areas where wolves have established to determine potential direct or indirect effects.

Strategy 9 - Coordinate and cooperate with public agencies, landowners, and non-government entities to help achieve wolf conservation goals and objectives

- a. Seek opportunities (consultation, outreach) with various landowners to promote habitat improvement for native ungulates.
- b. Private landowners should be provided information on the location of den sites, the timing and duration of denning, and how to avoid disturbance of den and rendezvous sites.
- c. Providing current information to land management agencies will also be important. Similar to private landowners, protective measures will likely be site specific as federal actions will vary by location and land use practices.

Strategy 10 - Report on and evaluate implementation of the Plan.

- a. Prepare an annual update of the CDFW's activities to accomplish the goals, objectives and strategies of the Plan.
- b. Pursuant to Fish and Game Code section 2077, CDFW is scheduled to review the status of wolves in 2019 to determine if the conditions that led to the original listing are still present.

## IMPLEMENTATION

CDFW will implement actions, consistent with resources and authorities, in an approach that anticipates wolf re-establishment and population growth in three phases (Appendix G). Each phase includes appropriate potential actions although many actions will occur through all phases.

Phase 1 is now underway and will manage an initial wolf population consistent with state policy to conserve species listed as endangered under CESA, and while recognizing that any wolves in California are currently federally listed as endangered. Phase 1 is expected to account for the period of reestablishment of wolves as resident wildlife in California, first as individual dispersing wolves and then through formation of the first packs. CDFW defines an ending for Phase 1 when there are four Breeding Pairs (BP). A BP is defined as at least 1 adult female and at least 1 adult male and at least two pups as of December 31 of each year) for two successive years confirmed in California. At a minimum, this means at least 16 wolves. Based on information from Washington and Oregon, the estimated population at the conclusion of Phase 1 would likely be in the range of 45-65 wolves (Table 1.1, Part II Appendix G).

Phase 2 will begin after CDFW confirms five BPs for two successive years. This phase will likely correspond to the time when the California wolf population's growth is driven more by natural reproduction than by continued net immigration by Oregon wolves. This phase is envisioned as a period of time when wolves range into and inhabit suitable areas of northern California, and perhaps portions of the central Sierra Nevada. CDFW anticipates that additional relevant information will continue to become available, physical and biological conditions in California will continue to change, legal frameworks and authorities may change, and CDFW staff will have gained additional experience with wolves. Such events present an opportunity to adapt the Plan to conditions as they then exist. Initially, the Plan envisions that additional latitude to manage impacts of wolves on livestock or wolf predation on wild ungulate populations whose range overlaps that of wolves may be warranted in Phase 2.

Phase 3 will begin when CDFW confirms that there are at least 9 BPs. Based on information from Washington and Oregon, the estimated population at the end of Phase 2 and beginning of Phase 3 would likely be in the range of 50-75 wolves. This period should provide suitable time to conduct a status review of the species to evaluate whether state listing as endangered remains warranted, notwithstanding the existing requirement to review the status of a CESA-listed species every 5 years. Any status review will then be provided to the Commission for its consideration of the facts and whether they warrant some discretionary action by the Commission. Phase 3 is envisioned as implementation of long-term management strategies. Necessarily, this phase can only be framed in general terms because forecasting the details of this future is impossible using currently available information. For example, if wolves are then abundant they may be recommended for delisting. CDFW will defer development of specifics for long-term management until the middle of Phase 2 when better information about wolves and their distribution is available.

Phases 1 and 2 include measureable population thresholds to prompt subsequent adaptive management actions. Until recently, the standard practice of other state wildlife agencies and the USFWS has been to comprehensively monitor wolf packs, estimate minimum population sizes as of December 31, and acknowledge that the actual population size is probably larger than that estimate. As wolf populations have grown, the monitoring costs increased and federal funding to support these efforts has declined. Consequently, western states are turning to methods for estimating populations, rather than trying to count every wolf.

## **Management Limitations**

### **Legal Considerations**

Legal considerations relate to management ability. A primary challenge for CDFW in developing and implementing the Plan is that state and federal listing of wolves as an endangered species affects the state's ability to manage the species with respect to any possible use of lethal take for management. It is reasonably foreseeable that some forms of aversive conditioning and lethal take to protect human safety, to reduce livestock depredation, or to mitigate risks of substantial effects on native ungulates, may become warranted. However, while the wolf is state and federally listed as endangered these possibilities are very limited. If the CESA and ESA legal status of wolves was to change, CDFW may have increased authority to take wolves for management consistent with this Plan.

Similarly, as described above, existing state laws for wildlife management, including CESA, do not fully account for the challenges that wolves will likely present. Additional statutory authority will likely be necessary to provide mechanisms for resolving depredation by wolves on livestock. Occurrence of livestock depredation will be a certain result of wolf reestablishment in California.

Concern regarding wolf predation on native ungulates may present a limitation in CDFW's ability to conserve and manage the ungulate populations. This is heightened by the fact that California has significantly fewer elk than the other western states where wolves have become established. Elk are the preferred prey species in those states. Most of California's elk populations are small, which creates the possibility of localized significant impacts or extirpation of those populations thereby reducing abundance of native prey species. Resulting outcomes could include larger wolf territory sizes, lower wolf densities and switching prey preference to deer or other large herbivores because elk would be reduced in numbers.

### **Scientific information**

Available historical information on wolf distribution, abundance, and ecological role for California is largely non-existent. Although there is considerable scientific information available for wolves worldwide, much of it has uncertain or limited application to current



and future conditions in California. Consequently, an initial limitation on how best to apply conservation and management is the lack of information on how wolves will interact with their habitats, prey, livestock, and other factors in California. Monitoring and applied research are needed to fill this lack of information.

## **Funding**

Current resources available to CDFW for management of nongame wildlife such as wolves are limited. Existing programs, staffing, funding, and resources are not well equipped to take on the new additional responsibilities for conserving and managing wolves without sacrificing some other important threatened and endangered species work. In every other western state where wolves have become reestablished, it has been necessary to augment resources for the state wildlife agency to meet its responsibilities. This Plan proposes programs that currently do not exist, both to monitor wolf and prey populations, and to mitigate impacts of wolf depredation on livestock. Successful implementation of the plan will require authorities, staff, and financial resources to support those programs.

Within this Plan, CDFW presents strategies to implement conservation and management actions for wolves in California. Successful implementation will require adequate funding and staffing. Wildlife management policy activities, funding allocations, and decisions on implementation of management actions will occur based on CDFW capacity in consideration of other priorities. To fully implement the elements and strategies of the Plan, an appropriate program would need to be developed within CDFW coincident with staffing and secured funding. Presently, it is rare for such a program on a nongame species to exist in the absence of secured funding and positions.