CALIFORNIA ACTION PLAN

For

Implementation of Department of the Interior Secretarial Order 3362: "Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors"

Introduction - Secretarial Order 3362 (SO 3362) directs appropriate agencies within the Department of the Interior [U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS), and Bureau of Land Management (BLM)] to work in close partnership with the State of California to identify, enhance, and improve the quality of big-game winter range habitats and migration corridors on appropriate DOI managed lands in a way that recognizes state authority for conserving and managing big-game species and respects private property rights. Through research and land management actions, wildlife such as mule deer (*Odocoileus hemionus*; hereafter deer), pronghorn antelope (*Antilocapra americana*; hereafter pronghorn), Rocky Mountain elk (*Cervus canadensis*), Roosevelt elk (*C. c. roosevelti*), and Tule elk (*C. c. nannodes*; collectively hereafter elk) and other wildlife and their habitats may benefit.

Conditions in the broader landscape may influence the function of migration corridors and sustainability of big game populations. Such conditions may include habitat fragmentation, land use patterns, resource management, or urbanization. The United States Department of Agriculture (USDA), through the USDA Forest Service (USFS) and USDA Natural Resource Conservation Service, will collaborate with DOI, the states, and other natural resource managers across the broader landscape when developing an all-lands approach to research, planning, and management, for ecological resources, to include migration corridors in a manner that promotes the welfare and populations of elk, deer, and pronghorn, as well as the ecological integrity of terrestrial ecosystems in the plan area.

California has about 99.7 million acres of total land area, and approximately 22.9 million acres (23.0%) are managed by three DOI agencies: BLM (15.0 million acres; 15.0%), NPS (7.6 million acres; 7.6%), and USFWS (0.3 million acres; 0.3%; Fig. 1). An additional 20.8 million acres (20.8%) are managed by the USFS.

To achieve the objectives of SO 3362, the Department of Interior has asked states to identify 3-5 priority migration corridors or winter range habitats for big game species in their respective state. Where information on specific migration corridors or winter range habitat is lacking, the DOI has requested states to identify their top 2-3 research priorities to fill these data or knowledge gaps. The following summary outlines California's justification for fulfilling these requests.

The following migration corridors the California Department of Fish and Wildlife (CDFW) has identified reflect a careful consideration of population stressors, habitat quality and geography (Fig. 2).

Corridor/Winter Range – Mule Deer

Mule deer (*Odocoileus hemionus*) are common throughout the State of California. East of the Sierra Nevada Crest they are managed within premium deer hunt zones. Deer habitat in California includes a mix of densely forested summer range and more open shrub communities on winter range. These deer are mostly migratory, moving into both Oregon and Nevada, and as such are managed cooperatively with those states. Primary threats on summer range include development, fire impacts, lack of early seral habitat, and high human population and disturbance. On winter range, development, fire and conversion of habitats to invasive weed species and senescence of high quality forage are important issues for deer. Many migration corridors traverse multiple highway systems, which creates cumulative impacts in the form of direct mortality or conditions that tax deer energetically as they attempt daily or seasonal movements between ranges.

Conservation of deer habitat and management of herds will be challenging for deer managers with the CDFW. Land use practices often times conflicts with wildlife habitat needs. The USFS is the primary federal landowner (>20%) in California (Fig. 1) and often manages forests to provide a high canopy cover of even-aged stands. This not only reduces early seral habitat opportunity but provides widespread fuel for intense wild fire, which affects deer habitat across their range.

Many research projects have, or continue to monitor, deer movements but there are gaps in information. A comprehensive statewide migration assessment plan is currently being developed for deer in California. This project will collect high-resolution movement data suitable for robust spatial analyses to identify important corridors and stopover locations and provide much needed information to inform wildlife managers.

Mule Deer, Mono Ecoregion, Deserts Province, X9a Deer Hunt Zone

- Rationale for prioritization
    - Between 2002-2015, 1,845 deer fatalities were recorded on California Department of Transportation (Caltrans) facilities in District 9, which includes Mono County with 397 deer collisions occurring on the US Highway 395 corridor between State Route 203 and the Crowley Lake area.
    - A preliminary report by the University of California, Davis, identified Highway 395 on the east side of the Sierra Nevada as an area with statistically significant hotspots for vehicle-wildlife collisions (Shilling et al. 2016). In addition to deer, this area contains bear, mountain lion, numerous meso-carnivore species, and a variety of other wildlife.

- An 8-foot high, chain-link deer fence is planned for installation around the perimeter of the Mammoth-Yosemite Airport, which is located east of Highway 395 between mile markers 22.74 and 20.36. The fence will include a 1.7 mile long segment that abuts the Caltrans right-of-way on the east side of the highway. No adjacent fencing will be installed on the west side of the highway and no crossing structures are proposed to be constructed as part of the project. Because of the absence of suitable crossing structures, the fence will likely trap deer within the ROW and increase deer-vehicle collisions.
- This area is of high importance to deer as the habitats on both sides (east and west) of Highway 395 is utilized for summer range, migration, migration transition (holding areas for spring and fall migrations) and winter range during droughts.

- Spatial location
  - Located in Mono County, deer winter, transition and summer ranges are along Highway 395 from State Route 203 to Crowley Lake.
- Habitat types (Fig. 3)
  - Habitat varies depending upon altitude and aspect and includes shrub-steppe and shrub communities, open forest communities, and alpine meadows.
- Important stopover areas within the corridor
  - Limited anecdotal information available. This area provides important holdover habitat (Sherwin Holding Area) that is intensely used by deer for 6-10 weeks in the spring and for several months in the fall.
- Landownership (Fig. 4)
  - The USFS (Inyo National Forest) owns much of the land along the north section of the corridor. The Bureau of Land Management and the Department of Water and Power, City of Los Angeles own sections along the southern corridor.
- Land uses
  - Heavy recreation use and livestock grazing.
- Risks/Threats
  - Immediate Threats
    - High deer-vehicle collision rates along highways.
      - State Action: Identification of important seasonal crossing areas.
      - State and Federal Action: Funding and other support for installation of passes and other crossing structures in areas with the greatest need to reduce collisions and provide safe passage to deer and other wildlife during migration.
  - Long-term Threats
    - Increasing development and fragmentation of available winter and migratory habitat.
      - State Action: Identify site-specific crossing locations within the corridor.
    - Expectation of continued high-intensity catastrophic wildfires throughout the zone due to high fuel loads from historic fire suppression efforts and persistent drought conditions in recent years.

- Federal Action: Forest thinning, noxious weed control, and planting of native shrubs with prioritization for high-use deer areas on federal lands.

- Current efforts
  - Improving movement corridors for migratory deer in this area is of such importance that a multi-agency task force consisting of CDFW, Mono County, Mammoth Lakes, Caltrans, Eastern Sierra Land Trust, and BLM are developing a strategy to address the ongoing problem and seeking funds for implementation.
  - Caltrans has prepared a feasibility study that evaluated methods and concepts to reduce wildlife collisions (Caltrans 2016).

Mule Deer, Sierra Nevada Ecoregion, Central Valley and Sierra Nevada Province, X6a, X6b, and X7a Deer Hunt Zones

- Rationale for prioritization
  - This area contains migratory deer from two herds and the premium hunt zones X6a, X6b and X7a (an estimated 9,400 animals) which represents a big portion of the states deer and a highly threatened area. Deer have extreme financial and ecological value in this area. In addition to deer, this area contains pronghorn, an expanding population of elk, and occasionally bighorn sheep and gray wolf.
- Spatial location
  - Between Reno, NV and Susanville, CA on the east side of the Sierra Nevada Range along Highway 395.
- Habitat types (Fig. 5)
  - Habitat varies and includes sagebrush steppe and shrub communities, dense forest communities, and agriculture lands.
- Important stopover areas within the corridor
  - Limited information available, these tend to be quick and short migrations but stopovers exist. In the Loyaton-Truckee Herd these include the Antelope Valley Wildlife Area, Dog Valley, Bear Valley, and the Prosser/Boca Reservoir area.
- Landownership (Fig. 6)
  - Most of the area is owned by public agencies, with the Tahoe and Lassen National Forests, BLM, and CDFW's Hallelujah Junction and Doyle Wildlife Areas (HJWA) being the major public land holdings. Private timber companies also own large portions of forested areas within this area. Most other lands held in private ownership are interspersed along the highway including developments at Cold Springs, Doyle, Janesville and others.
- Land uses
  - Livestock grazing, human development, recreation, and timber harvest are the predominant uses.
- Risks/Threats
  - Immediate Threats
    - Conversion of habitat to invasive weeds in wintering areas due to disturbance from largescale and high-intensity wildfires, conifer

encroachment on open shrub communities, senescence of nutritional forage.
        - Growing use and distribution of motorized and non-motorized off-road vehicles and increasing disturbance on winter ranges.
        - High deer-vehicle collision rates along certain sections of the highway.
        - Crossings exist at HJWA and on Highway 89 but additional structures and fence are needed. Connectivity must be created and maintained across the highway to reduce collisions and other cumulative impacts from barriers during daily and seasonal movements.
        - Persistent drought conditions resulting in reduced overall nutritional carrying capacity of the landscape and new indications of shifts in migration strategy, which could condense deer on summer range if they don't migrate.
    - Long-term Threats
        - Increasing development and fragmentation of available winter and migratory habitat in the area. Nevada does not have CEQA/CESA processes to limit or mitigate development. As Reno expands, winter range is being heavily developed. Critical ranges and corridors must be identified and protected.
        - Expectation of continued high-intensity catastrophic wildfires throughout the area due to high fuel loads from historic fire suppression efforts and persistent drought conditions in recent years.
        - Mid-elevation forests used by deer during the spring and fall are mostly comprised of closed-canopy, over-stocked stands of mixed conifer species with little understory vegetation. Burns and cuts on privately owned timberlands or FS lands are often treated with herbicide and replanted with single age stands, eliminating early seral conditions.
- Current efforts
    - CDFW has been working to improve communication with the Caltrans to increase planning and mitigation of road projects in impacted areas. The Highway 89 Stewardship Team (H89ST) constructed three underpasses with fence and jumpouts on Highway 89, a stretch that deer in the area cross. CDFW has also collaborated with the Nevada Department of Wildlife to address interstate deer issues, connectivity between states and end-run issues at deer fences along the border.
    - Post-fire activities have included seeding for bitterbrush.
    - Juniper removal projects on CDFW land.
    - A number of collars have been deployed for use in a population estimate project, and by the H89ST to monitor and effectively place crossings on the highway. More detailed analysis with a focus on migration and stopovers is needed.
    - BLM have performed post-fire restoration activities following the Long Valley Fire in 2017. They also plan to replace ~3,600' of 8' tall fencing in the Fort Sage Off-highway Vehicle Area with wildlife friendly fencing to facilitate better access to surrounding BLM lands and habitats. Additional post-fire rehabilitation plans

include drill, broadcast, and hand-seeding of ~5,353 acres of burned shrubland communities. Noxious week control will occur through implementation of the Eagle Lake Prevention Schedule.

Mule Deer, Sierra Nevada Ecoregion, Central Valley and Sierra Nevada Province, X7b Deer Hunt Zone

- Rationale for prioritization
  - This area contains migratory deer from the Loyalton-Truckee Deer Herd in the premium hunt zone X7b (an estimated 1,500 animals). Summer range is very limited and highly developed leaving small pockets of intact habitat. Migration is short but is constricted by the Truckee River, the railroad tracks and Interstate 80 through the Truckee River Canyon. Deer have extreme financial and ecological value in this area. In addition to deer, this area contains bear, mountain lion, occasional gray wolf and a variety of other wildlife.
- Spatial location
  - This area is a smaller stretch along Interstate 80 from Donner Summit in CA to Verdi, NV.
- Habitat types (Fig. 7)
  - Habitat varies as you move west to east but includes coniferous forest with closed canopy, bitterbrush and shrub communities, riparian habitat, and pockets of aspen.
- Important stopover areas within the corridor
  - Stopovers are not prevalent in this short migration. Deer move quickly between summer and winter range but tend to stay on summer range later in the year until snow and temperature pushes them out, sometimes in December.
- Landownership (Fig. 8)
  - Much of this area is privately owned with the Tahoe National Forest and CDFW comprising the majority of the public land.
- Land uses
  - Livestock grazing, human development, and recreation are the predominant uses.
- Risks/Threats
  - Immediate Threats
    - Development has been somewhat limited with CEQA but does continue, especially around already impacted ski resorts, and the town of Truckee.
    - Fragmentation by development, the interstate, railroad, river, and recreation is prevalent throughout the area.
    - Direct vehicle mortality on the interstate and roads throughout developed areas along with high predator concentrations are additive mortalities to the deer herd.
  - Long-term Threats
    - Most of the deer in this zone are migratory and winter in the lower elevations on the Nevada side. Summer range habitat is limited, and weather conditions such as persistent drought has caused shifts in migration strategy, concentrating deer year-round on limited summer range. This could change the herd dynamics drastically.

        - Conversion of habitat to inhospitable cheatgrass communities.
        - Moving around barriers to reach desired habitat is energetically taxing. Fecundity and fawn survival could be an issue if connectivity is not restored or maintained.
        - Interstate 80 is one of several highways, but the most significant that bisects the Sierra Nevada mountain range. Major crossing features to connect habitat on either side are absent but needed and could open the corridor to movement by many species, including sensitive meso-carnivores.
- Current efforts
    - Projects on CDFW lands have involved noxious weed control and natural regeneration after fire.
    - Monitoring of deer crossing under the highway with cameras.
    - CDFW has used GPS collars to update the Loyalton-Truckee Deer Herd Plan.
    - USFS has performed revegetation and habitat restoration in key winter habitats for mule deer following wildfires across the area. Additionaly, ~500 ac. are treated annually to control invasive plants to reduce wildfire risk and risk of vegetation type conversion to annual invasive grasses. Treatments include mechanical, biological (insects), hand, and herbicide treatments. Key riparian and meadow areas are the focus of reseeding and replanting efforts (~100 ac.). The Humboldt-Toiyabe National Forest is a member of a wildlife working group that focuses on opportunities to improve habitat for mule deer and other wildlife within this important deer migration corridor.

<u>Corridor/Winter Range – Elk</u>

Roosevelt Elk, Northern California Coast Ecoregion, North Coast and Klamath Province, Northwestern Elk Hunt Zone

- Rationale for prioritization
    - Along the north coast, populations of Roosevelt elk have expanded dramatically in the last 20 years. Del Norte and Humboldt counties in northwestern California have experienced growing conflict as a result of burgeoning Roosevelt elk herds and vehicle collisions along the Highway 101 corridor.
    - As these Roosevelt elk populations continue to grow, access to suitable habitat can be limited by barriers such as Highway 101 and elk may tend to concentrate on private lands creating even more conflict and management issues by potentially impacting agricultural crops and property. CDFW continues to work with local governments, tribes, and landowners to expand hunter opportunities to help reduce conflict and manage the growing Roosevelt elk populations. Improving movement corridors may also help increase the accessibility of elk on public land and thereby reduce conflict.

- Elk respond predictably to increased hunting pressure and traffic density by becoming more mobile and expending more energy avoiding people and roads (Hurley and Sargeant 1991, Lyon and Canfield 1991). In addition, increased road density has been shown to increase the probability of mortality in cow elk, to decrease the ratio of bulls to cows, and to increase hunting harvest mortality when compared to relatively roadless areas (Leptich and Zager 1991, Unsworth et al. 1993, Leptich et al. 1995).
- A preliminary report by the University of California, Davis, identified U.S. 101, a major highway running north and south through Del Norte and Humboldt counties, as an area with significant hotspots for vehicle-wildlife collisions (Shilling et al. 2016). The North Coast (Caltrans District 1) was reported as having the third highest density for wildlife-vehicle conflict (Shilling et al. 2017).

- Spatial location
  - North coast of California along the Highway 101 (Del Norte and Humboldt counties).
- Habitat types (Figs. 9 and 10)
  - Habitat varies from forested timberlands to agricultural lands.
  - Elevation in this area ranges from sea level to over 6,000 feet. Generally, most of Humboldt and Del Norte counties provides suitable habitat for elk including conifer and mixed conifer-hardwood forest, oak woodlands, montane and bottomland grasslands, and marshes.
- Important stopover areas within the corridor
  - Elk that exist along the coast tend to utilize small home ranges and do not migrate seasonally. This has led to an area of high concentration of elk along Highway 101. Inland there does appear to be seasonal changes in habitat utilization but this extent is much smaller than what is observed in other parts of the state.
- Landownership (Figs. 11 and 12)
  - Private ownerships inhabited by elk include timberlands, ranches, dairies, farms, and rural residential areas.
  - Ownership is mixed between public, tribal and private holdings with some large blocks of USFS and private timber.
  - Approximately 60% of this area is privately owned with most public land administered by the USFS (Six River National Forest), BLM (Lacks Creek and King Range), and Redwoods National and State Parks property.
- Land uses
  - The main land use in this area includes timber production and agricultural practices ranging from irrigated crop production to dairy and cattle production.
- Risks/Threats
  - Immediate Threats
  - Several herds of elk routinely cross Highway 101 and are utilizing area adjacent to roadways to an extent that causes serious safety concerns for motorists.

Table 1. Number of accidents related to animal collisions along two stretches of Highway 101 extending from Trinidad, CA to the Del Norte/Humboldt County line (mile marker 100.705 to 137.144) and from Mill Creek to the

Oregon/California State line (mile marker 20.270 to 46.492). Information provided by the Department of Transportation from 1 January 2005 to 30 June 2015.

Mile Marker		Total Accidents	Fatalities	People Injured	Species	
Start	End				Deer	Other
20.270	46.492	66	1	8	52	13
100.705	137.144	82	0	22	59	20

Table 2. Average daily traffic, represented as the number of vehicles per day, from 1 January 2015 to 30 June 2015 along two stretches of Highway 101 extending from Trinidad, CA to the Del Norte/Humboldt County line (mile marker 100.705 to 137.144) and from Mill Creek to the Oregon/California State line (mile marker 20.270 to 46.492).

Mile Marker		Average Daily Traffic
Start	End	
20.270	46.492	8,000
100.705	137.144	3,800

- Long-term Threats
  - As population numbers increase along this section of highway, an increase in collisions is anticipated.

- Current efforts
  - Current research efforts on the North Coast are being accomplished through Federal financial assistance made available through the Pittman-Robertson Wildlife Restoration Act.
  - The main objective of current research efforts focuses on providing information about elk population parameters for management and conservation planning. Knowledge about the relative abundance, distribution, and population trends is important in the assessment of past management plans and practices.
  - 31 elk are currently collared in Humboldt and Del Norte counties. This collar data allows the collection of the following data: subherd identification, habitat use and resource selection, movement patterns and population connectivity, recruitment estimates, calf survival, causes of mortality, and mark-resight estimates of abundance. Several techniques for monitoring elk populations in northern California are also beginning to be examined. These include: road surveys, camera traps, and fecal DNA mark-recapture estimates. This research will lead to the development and implementation standardized monitoring protocols for estimating elk population parameters.

- BLM has completed ~200 acres of oak woodland and grassland restoration in Lacks Creek Management Area. They have also removed Douglas-fir and replanted with native grasses to improve forage for elk. Several prairie burns have also been deployed, and all of these BLM activities have been undertaken with contributions from Rocky Mountain Elk Foundation (RMEF), Mule Deer Foundation, and California Deer Association.

Tule Elk, Central Valley and Sierra Nevada Province and Bay Delta and Central Coast Province, San Luis Reservoir Elk Hunt Zone

- Rationale for prioritization
  - This area contains the San Luis Reservoir Tule Elk meta-population, which is estimated at 1,000 animals. Tule elk are still recovering from near extirpation and require large tracts of land to support healthy populations.
  - Information on movement corridors between habitat patches is needed to identify and model critical habitats, linkages, and barriers to movement, which hinder critical gene flow.
  - The information from this project will benefit current and future management and conservation practitioners by providing them with spatial and resource selection information which describe and delineate areas of important use including home ranges, calving areas, habitat use, barriers, and meta-population movement corridors.
- Spatial location
  - Located in Merced County, the elk subpopulations around San Luis Reservoir within the San Luis Reservoir Tule Elk Hunt Zone.
- Habitat types (Fig. 13)
  - Habitat varies depending upon elevation and aspect and includes non-native annual grasslands and oak woodlands.
- Important stopover areas within the corridor
  - Data collected from GPS collars that have been deployed since 2015 are currently being analyzed.
- Landownership (Fig. 14)
  - Ownership is distributed between CDFW property, California Department of Parks and Recreation, Bureau of Reclamation, and Private.
- Land uses
  - Land use in the area is comprised mainly of livestock grazing, agriculture, and recreation.
- Risks/Threats
  - Immediate Threats
    - Elk-vehicle collision rates along highways.
      - State Action: Identification of important seasonal crossing areas.
      - State and Federal Action: Funding and other support for installation of passes and other crossing structures in areas with the greatest need to reduce collisions and provide safe passage to elk during migration and daily movements.

        - High-speed Rail
            - State Action: Identification of important use areas including calving grounds, home ranges, and crossing areas.
            - State and Federal Action: Funding and other support for installation of passes and other crossing structures in areas with the greatest need to reduce collisions and provide safe passage to elk during migration and daily movements.
    - Long-term Threats
        - Increasing development and fragmentation of habitat.
            - State Action: Delineation of important movement corridors and stopover locations to support empirically-based decisions regarding prioritization of habitat conservation needs in those areas.
        - Expectation of continued conversion from native habitat to non-native invasive plant species.
            - State and Federal Action: Large-scale habitat restoration is needed to restore the habitat to support a healthy ecosystem. Prescribed burns and noxious weed control along with revegetation efforts are needed.
        - Low genetic diversity
            - State Action: Delineation, preservation, and creation of important movement corridors is needed to maintain and facilitate critical gene flow between sub-groups and meta-populations.
- Current efforts
    - CDFW has been working to improve communication with the Caltrans to increase planning and mitigation of road projects in impacted areas.
    - CDFW has been coordinating with California State Parks regarding habitat restoration projects on State Parks lands.
    - CDFW has been working with the Santa Clara Open Space Authority and Pathways for Wildlife to implement the Highway 152 permeability study, which is aimed at assessing impacts from the highway on wildlife species.
    - CDFW has been providing information to the High-Speed Rail Authority on elk biology and preliminary movement data to reduce or eliminate impacts to elk and improve public safety.
    - Forty-three GPS collars have been deployed on elk in different sub-groups inhabiting the San Luis Reservoir area. The collar data will supply detailed movement data to assess barriers, habitat usage, and provide a robust population estimate and sightability correction model. A detailed analysis with a focus on migration and stopovers is needed once the data collection phase is completed.
    - BLM actively manages habitats for Tule elk in the Hernandez Valley, including yellow star-thistle (*Centaurea solstitialis*) control in partnership with RMEF.

Research Needs

While CDFW has extensive history and telemetry data sets for ungulates, the scale and technology in which much of the data was collected does not allow for fine-scale movement analysis. Collection and analysis of movement data is a primary research priority for CDFW to inform management questions, such as improving our understanding of stopover areas, home ranges and survival; possible disease transmission pathways or locations that may have herd level impacts; habitat conservation priorities; and reduction of potential conflicts with vehicles.

Mule Deer, Mono Ecoregion, Deserts Province, X9a Deer Hunt Zone

- Specific need
  - Produce the Project Implementation Document (PID) for the Caltrans District 9 Wildlife Vehicle Collision Reduction Project
- Details of the need
  - $70,000
  - Funding to cover the cost of the PID which is a prerequisite to project implementation.
- How responding to the need will result in immediate progress
  - Completion of the PID will allow the process of the Caltrans District 9 Wildlife Vehicle Collision Reduction Project to move forward to the next stage.
- Specific need
  - Identify a funding source for Caltrans District 9 Wildlife Vehicle Collision Reduction Project (Highway 395 corridor between State Route 203 and Crowley Lake area).
- Details of the need
  - $48,012,604
  - Funding for the cost of Concept 6 as identified in the Caltrans District 9 Wildlife Vehicle Collision Reduction- Feasibility Study Report.
- How responding to the need will result in immediate progress
  - The next step in the process for accomplishing Concept 6 as outlined in the Caltrans District 9 Wildlife Vehicle Collision Reduction Project can begin once the PID is completed.

Mule Deer, Sierra Nevada Ecoregion, Central Valley and Sierra Nevada Province, X6a, X6b, X7a, and X7b Deer Hunt Zones

- Specific need
  - High-resolution, long-term movement data for deer in areas where crossings are most needed. High-use corridors and stopover locations must be identified, connected and protected. Data will also identify response to climate change and barriers.
- Details of the need
  - $295,150
  - Funding to cover the cost of

        - 60 satellite GPS collars, battery replacements
            - $131,400
            - $750
        - Collar service fees (air time)
            - $18,000 ($100/collar/year x 3 years)
        - Capture of 60 deer in each larger area by a contracted professional net gun crew on winter range
            - $40,000 requested
        - Contract seasonal services for analyses
            - $105,000 ($50,000 per year x 3 years)
- How responding to the need will result in immediate progress
    - Immediate collection of location data for delineation of deer migratory corridors prior to any future wildfires, developments, effects from climate change, barriers.
    - Provide empirical data in response to internal and external requests for information about deer habitat use in areas currently experiencing development pressure.
    - Begin building datasets needed to provide state and federal land managers with deer habitat use information vital to meaningful planning and implementation of successful habitat management activities and road mortality mitigation.
    - Begin work to estimate survival parameters that are a critical part of development and implementation of zone-wide deer population models.
    - Deliverables will inform management decisions and improve our ability to communicate agency priorities in habitat management to the public, state wildlife commissioners, and sister agencies such as Caltrans.
- Technical assistance
    - Contracted seasonal costs would cover assistance with data analysis, tracking collars, mapping and reporting.

Roosevelt Elk, Northern California Coast Ecoregion, North Coast and Klamath Province

- Specific need
    - Long-term habitat utilization and movement data is necessary to identify locations for roadway modifications to allow for increased roadway safety.
        - The Washington Department of Transportation installed elk crossing signs with flashing beacons that utilize stationary receivers to detect collared elk. This system was operational in 2000 along a stretch of Highway 101 and a subsequent decrease in collisions were observed even with an increase in traffic volume and a speed limit increase (K. McAllister, Washington Department of Transportation, unpublished report).
    - Humboldt and Del Norte counties contain a significant amount of suitable habitat that is unoccupied by elk. The Department aims to achieve a robust and well-distributed elk population in areas where elk depredation conflicts are minimal and provide for public use opportunities.
        - Private lands where the presence of elk may be tolerated or encouraged include timberlands, ownerships enrolled in the Private Lands

Management Program (PLM), and other properties where elk are desired by the landowner. Where conflicts occur, management actions should be implemented to alleviate conflicts while maintaining a viable overall elk population. Where suitable, unoccupied elk habitat exists, management actions should facilitate natural dispersal or through translocations to re-establish elk where conflicts will be minimal.

- Data is needed on habitat utilization and movement of elk in this area to inform future management efforts to encourage range expansion of elk onto suitable public lands.

- Details of the need
  - $388,869
  - Funding to cover the cost of;
    - GPS collars and data
    - Helicopter capture efforts
    - Roadway warning systems

	Units Needed	Unit Price	Total Cost
Vectronic - Survey-2D IR collar	60	$1,293.00	$77,580.00
USB Bluetooth Stick	1	$90.00	$90.00
Activation	60	$30.00	$1,800.00
Data Fee - 5 years	60	$450.00	$27,000.00
Freight	1	$1,609.00	$1,609.00
Vectronic - Vertex Plus-3 collar	20	$2,534.00	$50,680.00
Data Fee - 2 years	20	$780.48	$15,609.60
Freight	1	$500.00	$500.00
Subtotal			$174,868.60
Helicopter Capture Efforts			
Rotor Hours (5 Days)	42	$2,000.00	$84,000.00
Subtotal			$84,000.00
Roadway Warning System (per 3 mile stretch of roadway)			
Sign construction, installation, electrical service	2	$50,000.00	$100,000.00
Telemetry receiver stations	2	$15,000.00	$30,000.00
Subtotal			$130,000.00
Equipment Grand Total			$388,868.60

- How responding to the need will result in immediate progress
  - Collars will be deployed on additional individuals along Highway 101 and countywide. This will allow the CDFW to:
  - Determine daily use corridors and hotspots of activity along Highway 101
    - Indicate need for an adequate wildlife crossing warning system.
    - Implement and test a crossing warning system at two locations, one in Del Norte and one in Humboldt County.

        - Improve safety conditions for drivers and wildlife along Highway 101.
    - Determine suitable habitat
        - Properly assess range expansion of elk onto public lands.
        - Justify management actions in the future to facilitate natural dispersal or translocations of elk where conflicts will be minimal.
    - Increase the CDFW's understanding of population size, population growth, movements, and habitat use of Roosevelt elk in Del Norte and Humboldt counties. Although elk populations have increased since the 1960s, large areas of suitable habitat remain unoccupied in northern California. Habitat selection and factors limiting population growth and expansion have largely been unstudied. Examining elk demographics and habitat selection is needed to better enhance the CDFW's ability to manage and conserve elk in the northern part of the state.

Tule Elk, Central Valley and Sierra Nevada Province and Bay Delta and Central Coast Province, San Luis Reservoir Hunt Zone

- Specific need
    - Additional funding for data analysis is needed. High-resolution movement data for this project has been collected. The collar data will supply detailed movement data to assess barriers, habitat usage, and provide a robust population estimate and sightability correction model. A detailed analysis with a focus on migration and stopovers is needed.
- Details of the need
    - $150,000
    - Contract seasonal services for analyses
        - $150,000 ($50,000 per year x 3 years)
- How responding to the need will result in immediate progress
    - Provide empirical data in response to internal and external requests for information about tule elk habitat use in areas currently experiencing habitat fragmentation.
    - Begin building datasets needed to provide state and federal land managers with tule elk habitat use information vital to meaningful planning and implementation of successful habitat management activities and road mortality mitigation.
    - Begin work to estimate survival parameters that are a critical part of development and implementation of zone-wide tule elk population models.
        - Deliverables will inform management decisions and improve our ability to communicate agency priorities in habitat management to the public, state wildlife commissioners, and sister agencies such as Caltrans.
- Technical assistance
    - Contracted seasonal costs would cover assistance with data analysis, mapping and reporting.

Literature Cited

Caltrans. 2016. Caltrans District 9 Wildlife Vehicle Collision Reduction – Feasibility Study Report. EA: 09-987111

Hurley, M. A., and G. A. Sargeant. 1991. Effects of hunting and land management on elk habitat use, movement patterns, and mortality in western Montana. Pages 10–12 in. Montana State University, Bozeman, Montana.

Leptich, D. J., and P. Zager. 1991. Road access management effects on elk mortality and population dynamics. Pages 126–137 in. Proceedings in elk vulnerability symposium. Montana State University, Bozeman, Montana.

Leptich, D. J., S. G. Hayes, and P. E. Zager. 1995. Coeur D'Alene Elk Ecology. Idaho Department of Fish and Game.

Lyon, L. J., and J. E. Canfield. 1991. Habitat selections by Rocky Mountain elk under hunting season stress. Pages 99–105 in. Montana State University, Bozeman, Montana.

Shilling, F. and D. Waetjen. 2016. Impact of Wildlife-Vehicle Conflict on Drivers and Animals. University of California Davis, UC Davis Road Ecology Center. https://roadecology.ucdavis.edu/files/content/news/CA_WVC_Hotspots_2016.pdf. Accessed 05 October 2018.

Shilling, F., Waetjen, D., and K. Harrold. 2017. Impact of Wildlife-Vehicle Conflict on Drivers and Animals. University of California Davis, UC Davis Road Ecology Center. https://roadecology.ucdavis.edu/files/content/news/CROS-CHIPs_Hotspots_2017_ES2.pdf. Accessed 05 October 2018.

Unsworth, J. W., L. Kuck, M. D. Scott, and E. O. Garton. 1993. Elk Mortality in the Clearwater Drainage of Northcentral Idaho. The Journal of Wildlife Management 57:495.

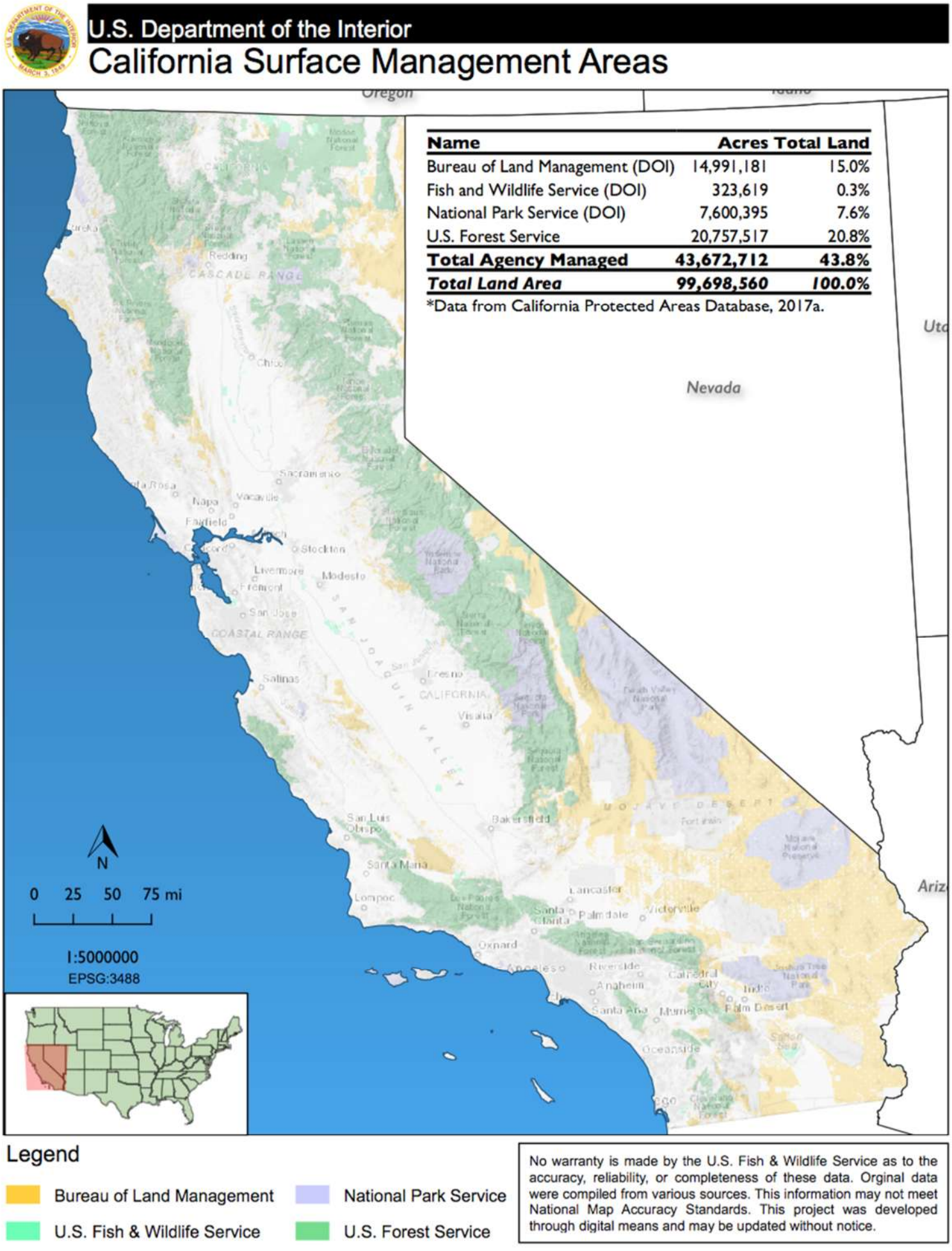


Figure 1. Federal surface management distribution in California for Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and U.S. Forest Service.

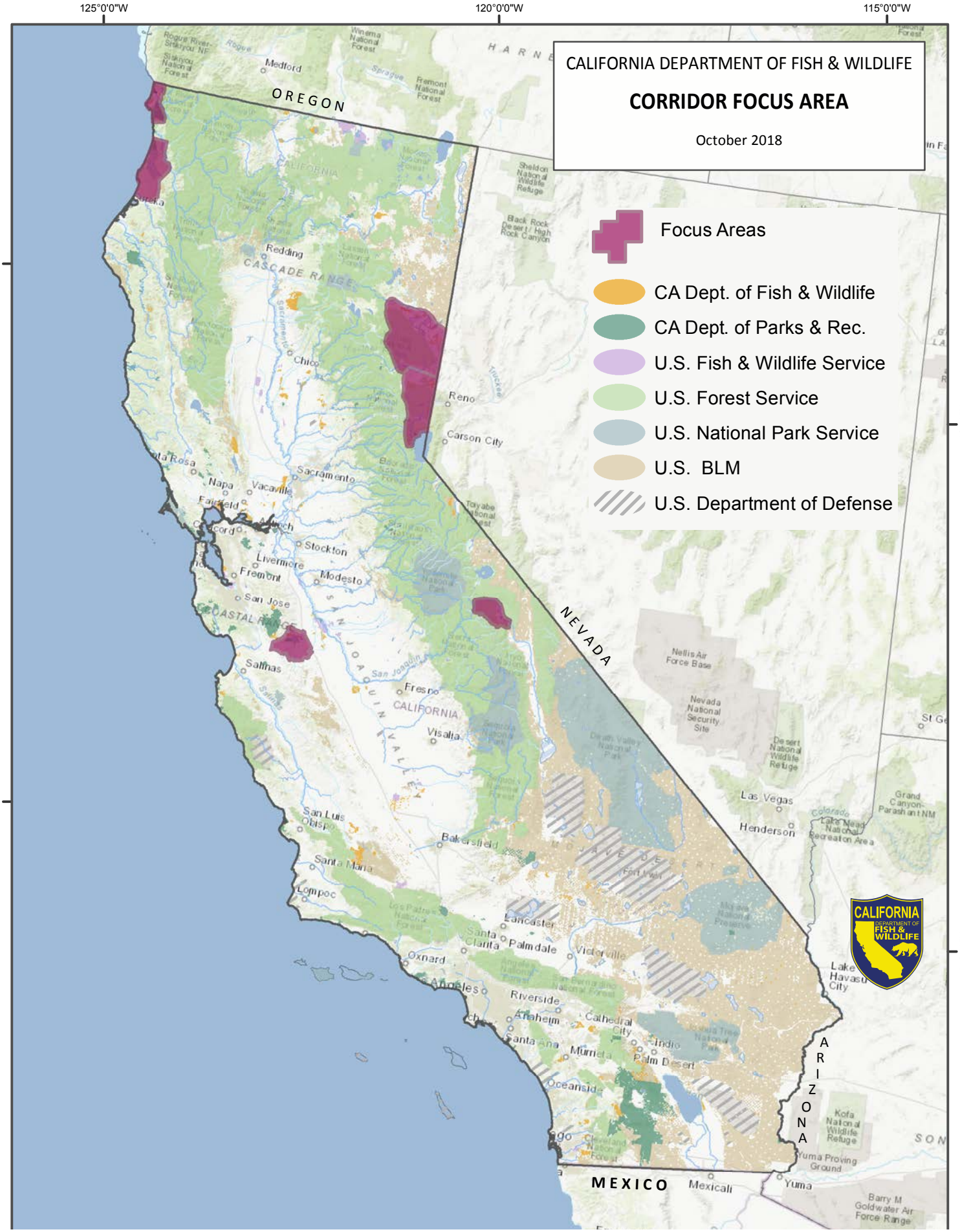
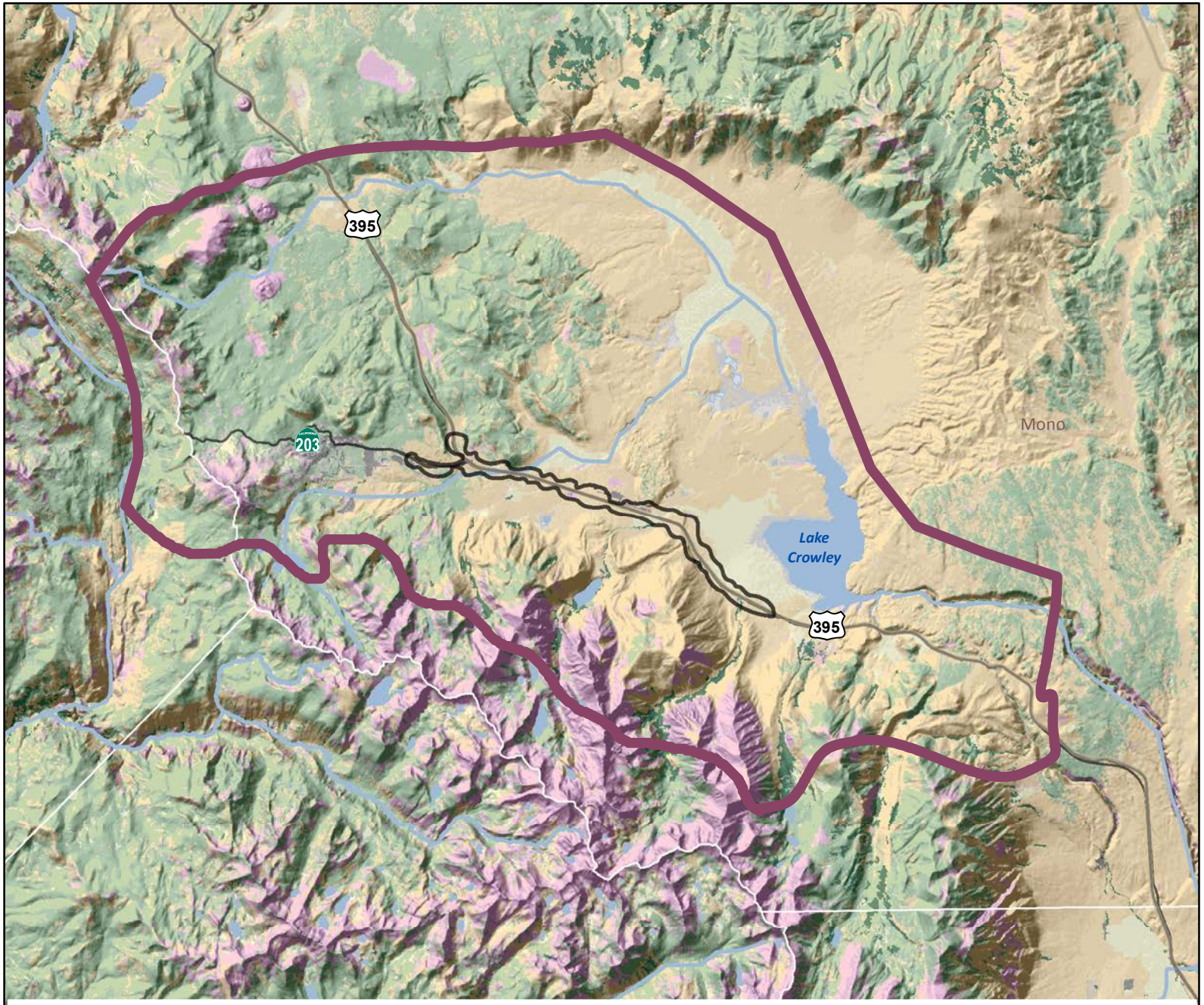


Figure 2. California Department of Fish and Wildlife corridor focus areas in response to U.S. Department of Interior's Secretarial Order 3362.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



HIGHWAY 203 TO LAKE CROWLEY

Land Cover

Focus Area
Focus Region
Conifer
Hardwood
Agriculture
Barren/Other
Herbaceous
Shrub
Urban

County Boundary
Waterbody
Ephemeral or dry lake

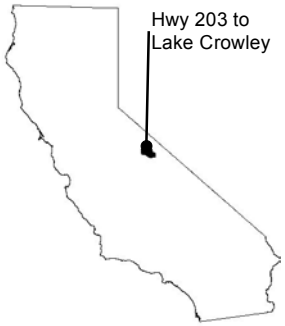
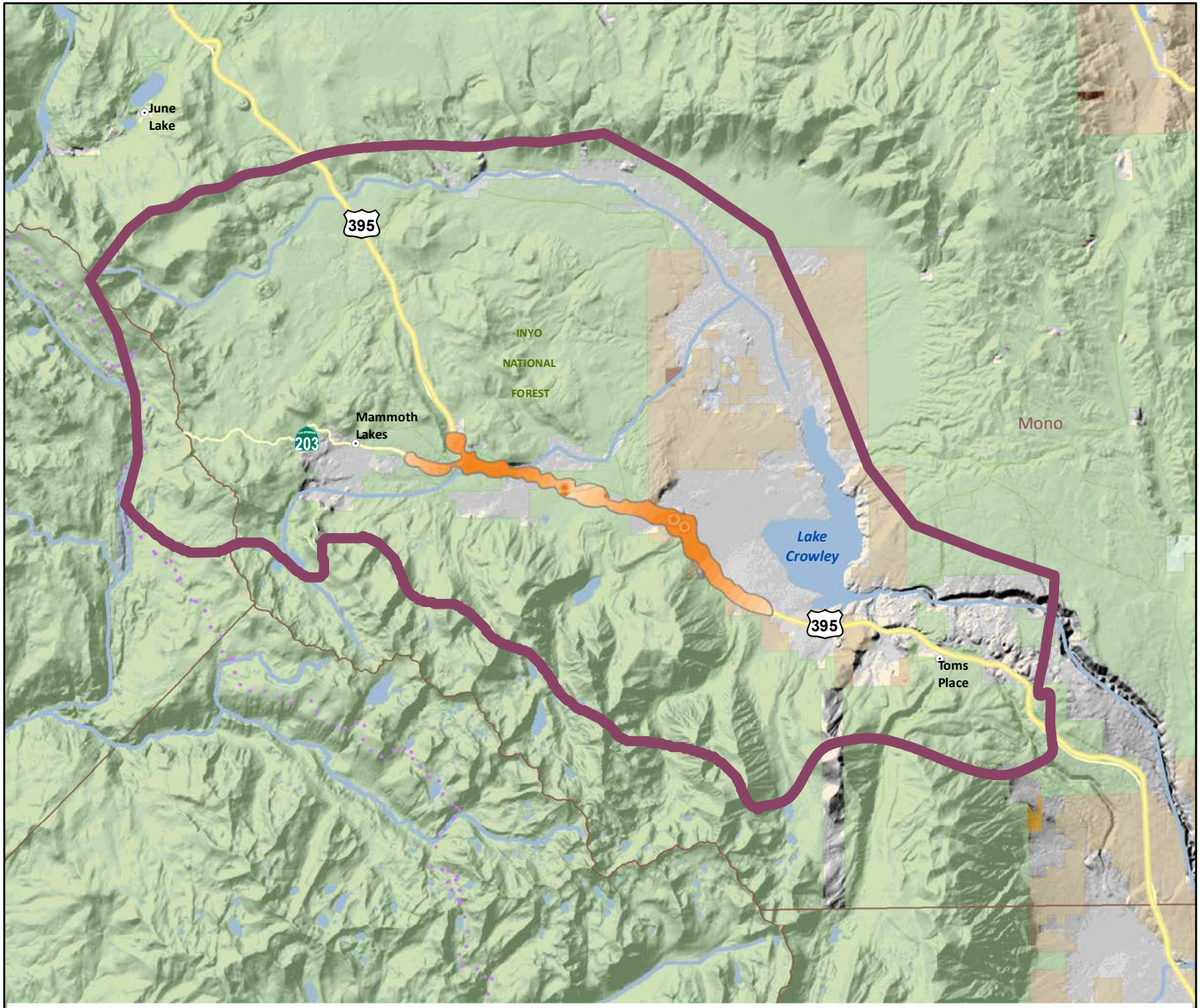


Figure 3. California Department of Fish and Wildlife priority corridor focal area for mule deer, Mono Ecoregion, Deserts Province, X9a Deer Hunt Zone depicting dominant vegetation cover type.

10/5/2018

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



HIGHWAY 203 TO LAKE CROWLEY

Land Ownership

- Focus Area
- Focus Region
- CA Dept. of Fish & Wildlife
- CA Dept. of Parks & Rec.
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- U.S. National Park Service
- U.S. BLM

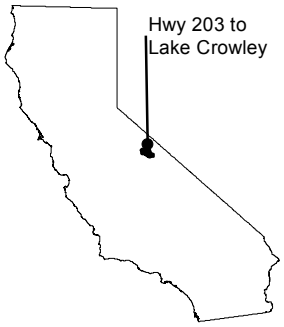
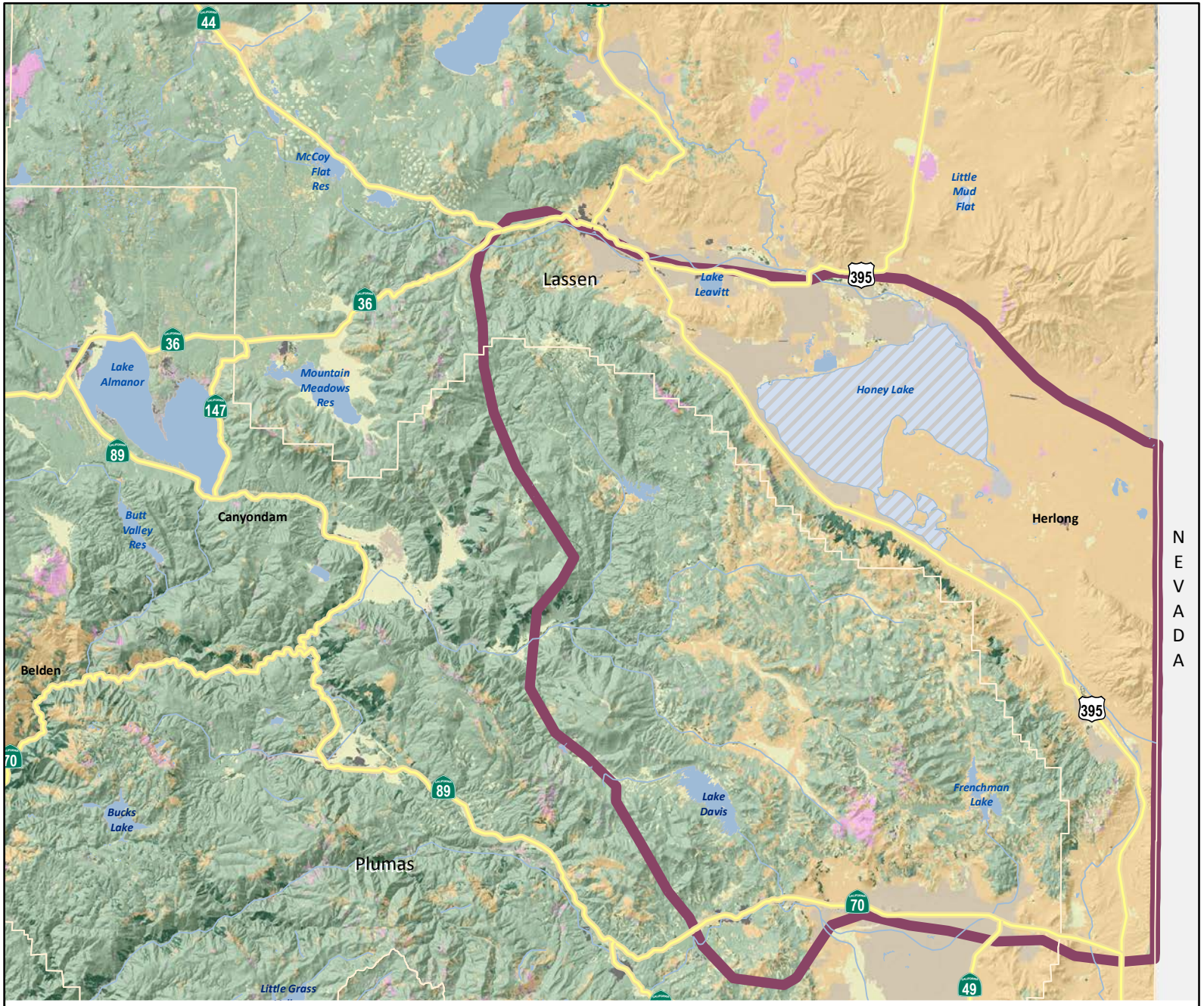


Figure 4. California Department of Fish and Wildlife priority corridor focal area for mule deer, Mono Ecoregion, Deserts Province, X9a Deer Hunt Zone depicting land management agency jurisdiction.

10/5/2018

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



MULE DEER
DOYLE HERD

Land Cover

- Doyle Herd-Focus Area
- Conifer
- Hardwood
- Agriculture
- Barren/Other
- Herbaceous
- Shrub
- Urban

- County Boundary
- Waterbody
- Ephemeral or dry lake

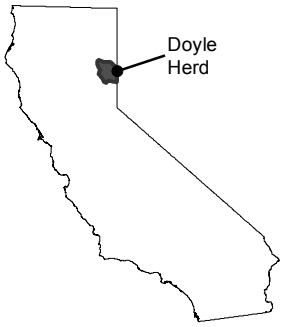


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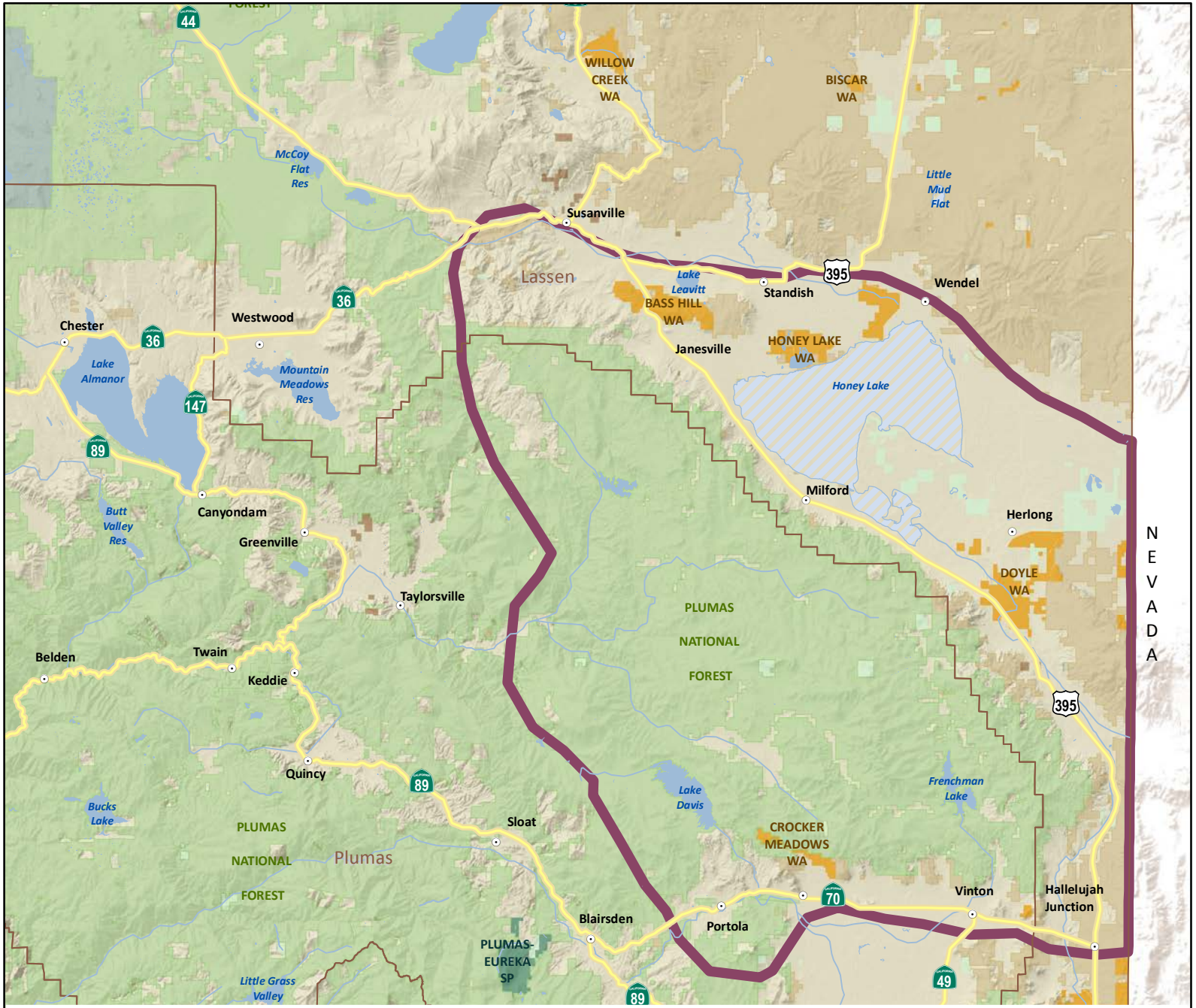
Figure 5. California Department of Fish and Wildlife priority corridor focal area for mule deer, Sierra Nevada Ecoregion-Central Valley and Sierra Nevada Province, X6a, X6b, and X7a Deer Hunt Zones depicting dominant vegetation cover type.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



MULE DEER DOYLE HERD

Land Ownership

- Doyle Herd-Focus Area
- CA Dept. of Fish & Wildlife
- CA Dept. of Parks & Rec.
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- U.S. National Park Service
- U.S. BLM

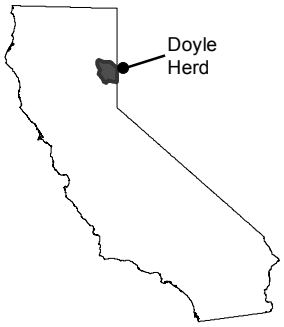
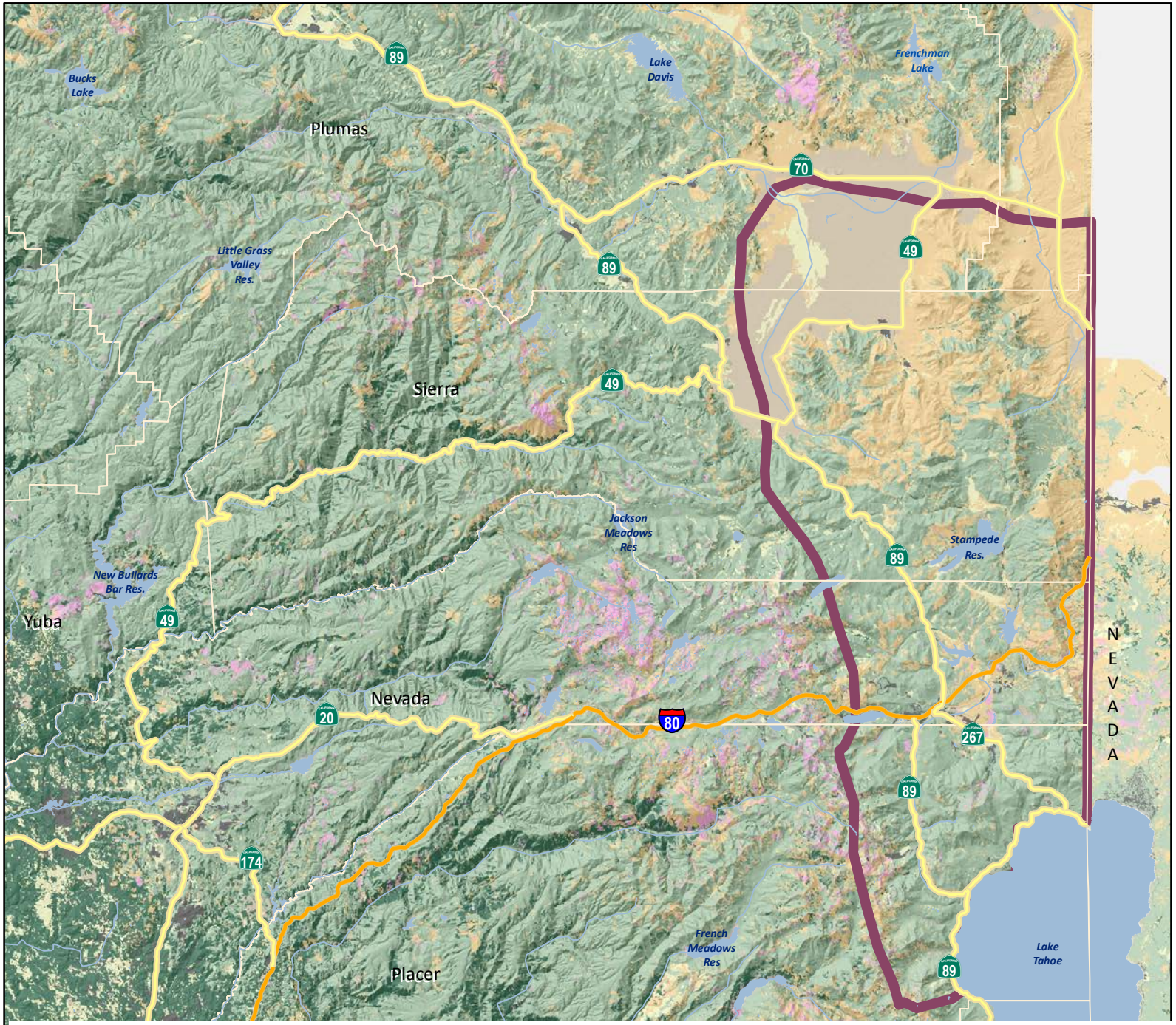


Figure 6. California Department of Fish and Wildlife priority corridor focal area for mule deer, Sierra Nevada Ecoregion-Central Valley and Sierra Nevada Province, X6a, X6b, and X7a Deer Hunt Zones depicting land management agency jurisdiction.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

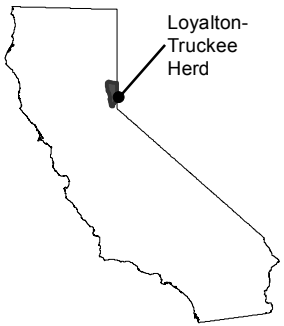


MULE DEER LOYALTON-TRUCKEE HERD

Land Cover

- Loyalton-Truckee Herd-Focus Area
- Conifer
- Hardwood
- Agriculture
- Barren/Other
- Herbaceous
- Shrub
- Urban

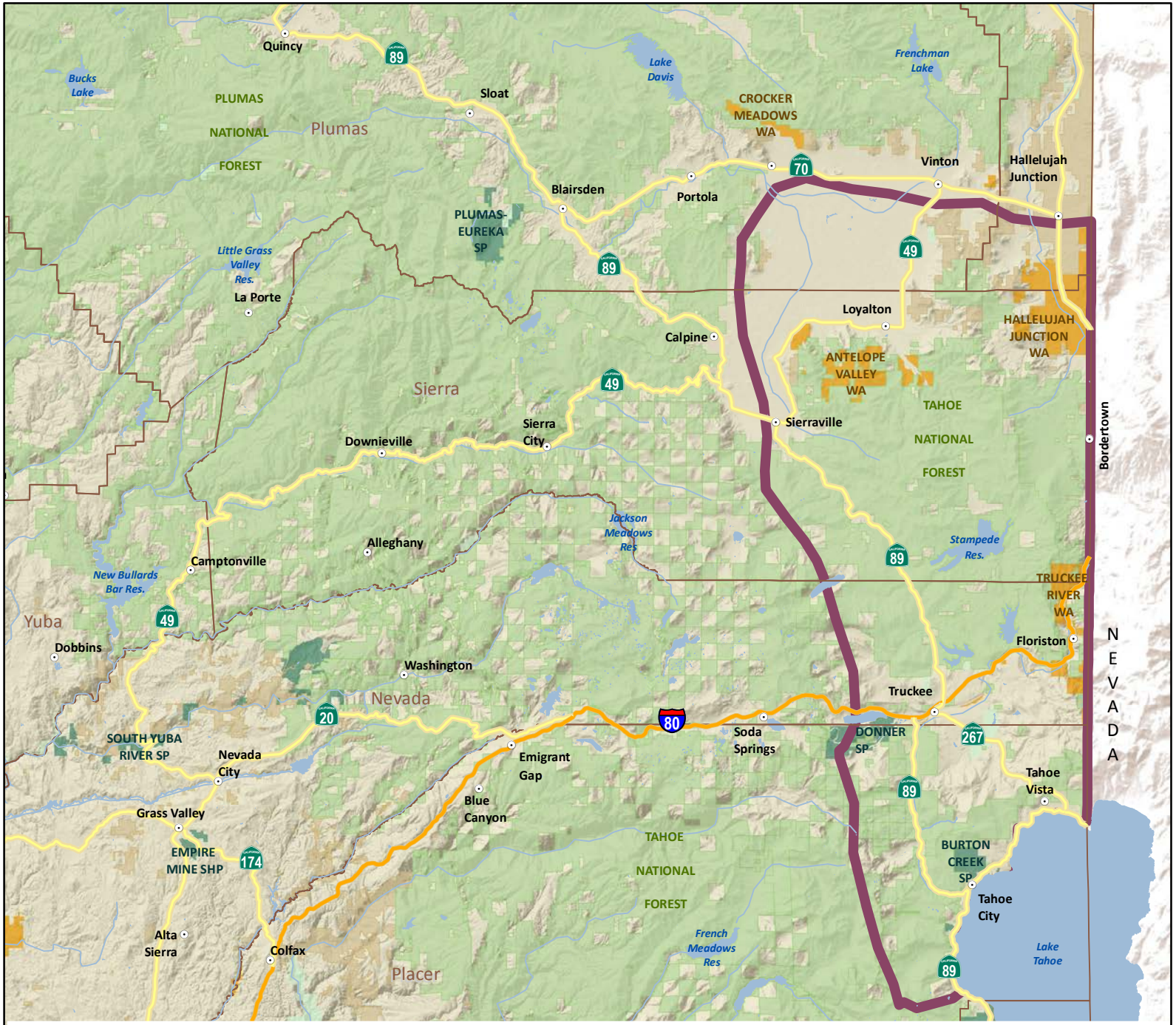
- County Boundary
- Waterbody
- Ephemeral or dry lake



10/25/2018

Figure 7. California Department of Fish and Wildlife priority corridor focal area for mule deer, Sierra Nevada Ecoregion, Central Valley and Sierra Nevada Province, X7b Deer Hunt Zone depicting dominant vegetation cover type.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



MULE DEER LOYALTON-TRUCKEE HERD

Land Ownership

- Loyalton-Truckee Herd - Focus Area
- CA Dept. of Fish & Wildlife
- CA Dept. of Parks & Rec.
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- U.S. National Park Service
- U.S. BLM

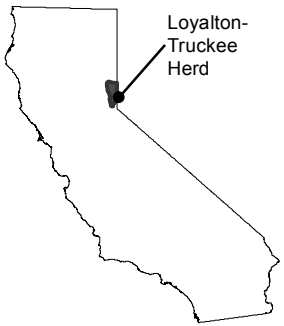


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Figure 8. California Department of Fish and Wildlife priority corridor focal area for mule deer, Sierra Nevada Ecoregion, Central Valley and Sierra Nevada Province, X7b Deer Hunt Zone depicting land management agency jurisdiction.

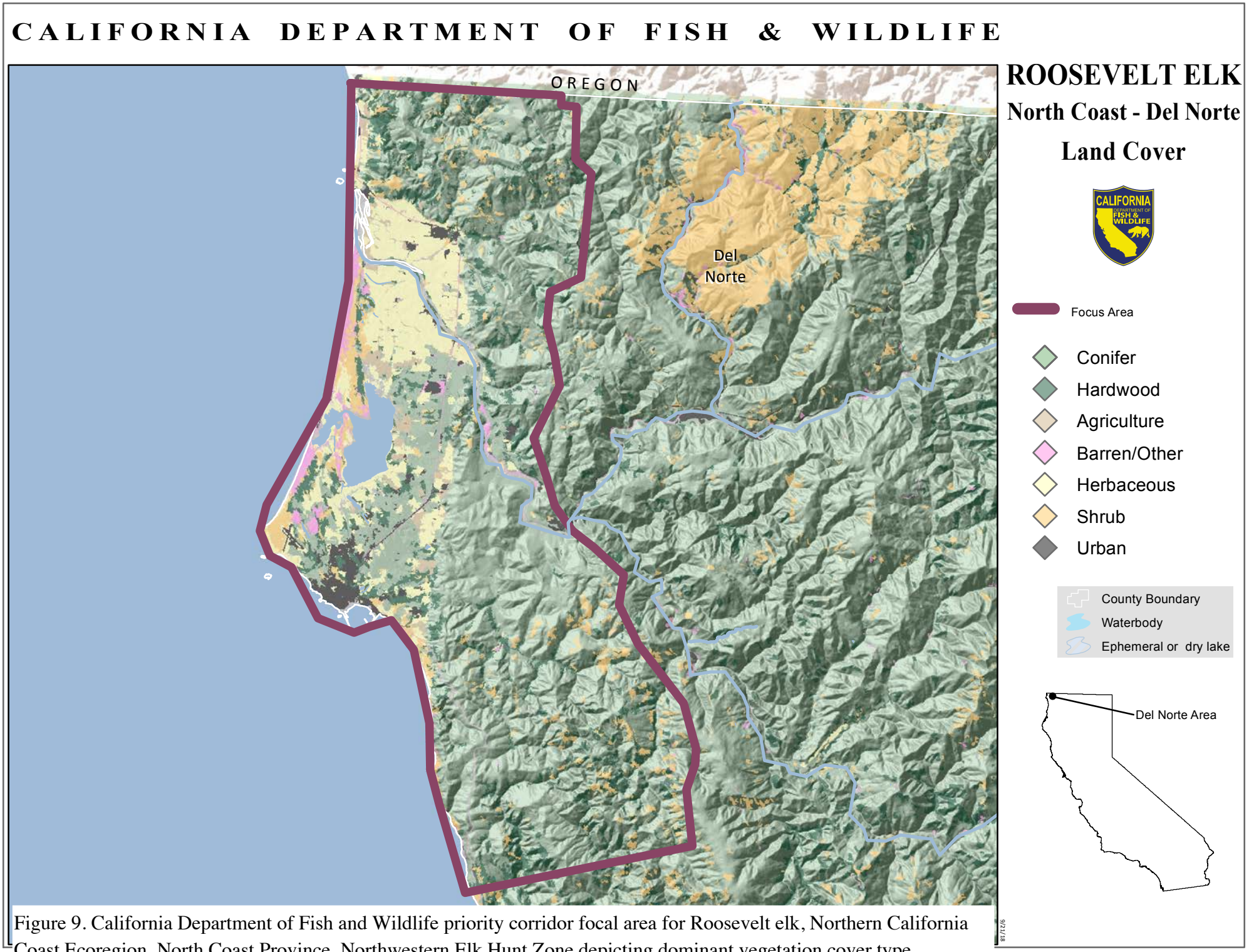
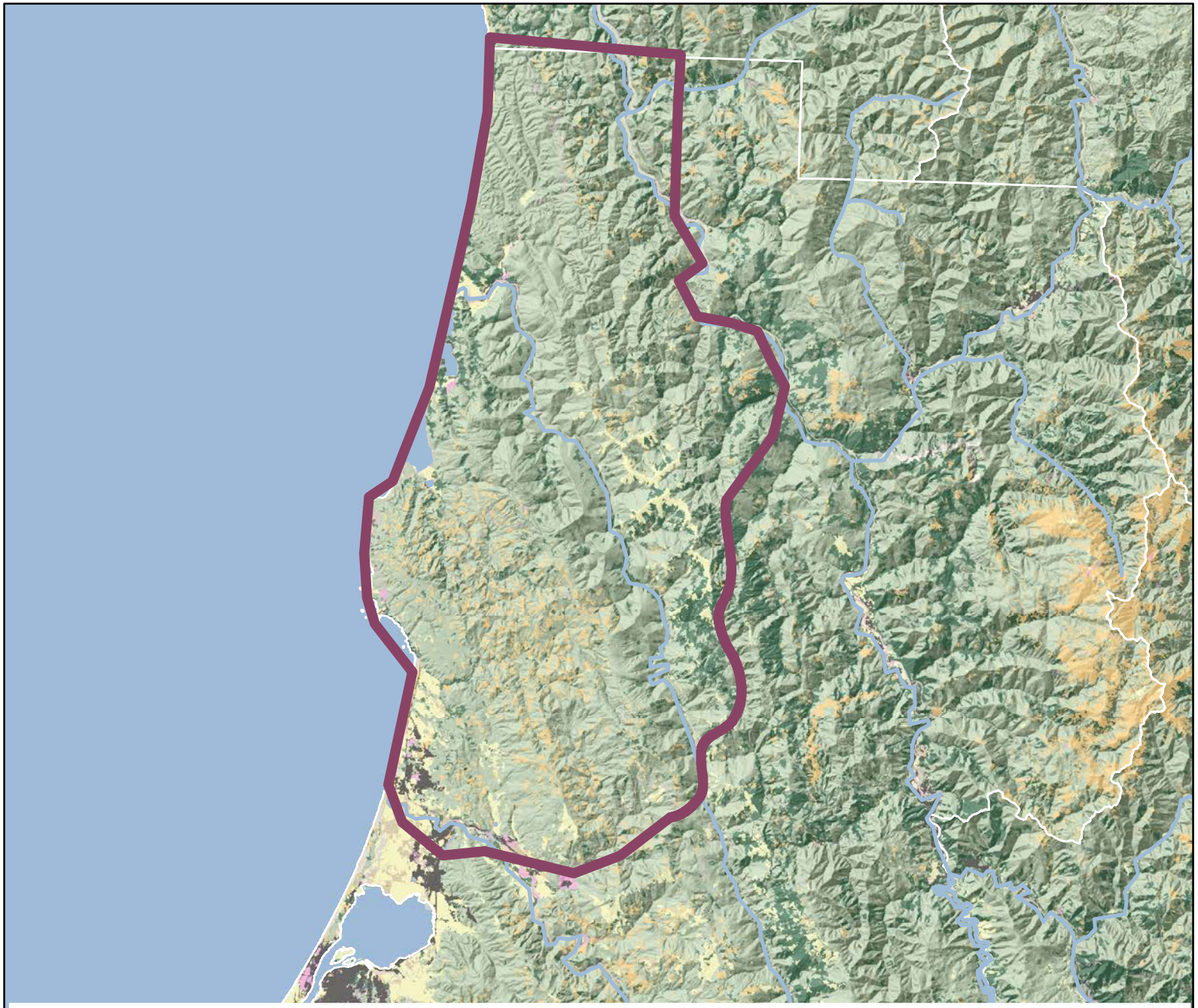


Figure 9. California Department of Fish and Wildlife priority corridor focal area for Roosevelt elk, Northern California Coast Ecoregion, North Coast Province, Northwestern Elk Hunt Zone depicting dominant vegetation cover type.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



ROOSEVELT ELK

North Coast Humboldt

Land Cover

Focus Area

- Conifer
- Hardwood
- Agriculture
- Barren/Other
- Herbaceous
- Shrub
- Urban

County Boundary
Waterbody
Ephemeral or dry lake

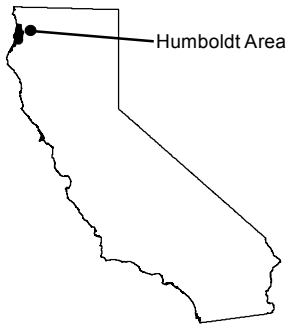


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Figure 10. California Department of Fish and Wildlife priority corridor focal area for Roosevelt elk, Northern California Coast Ecoregion, North Coast Province, Northwestern Elk Hunt Zone depicting land management agency jurisdiction.

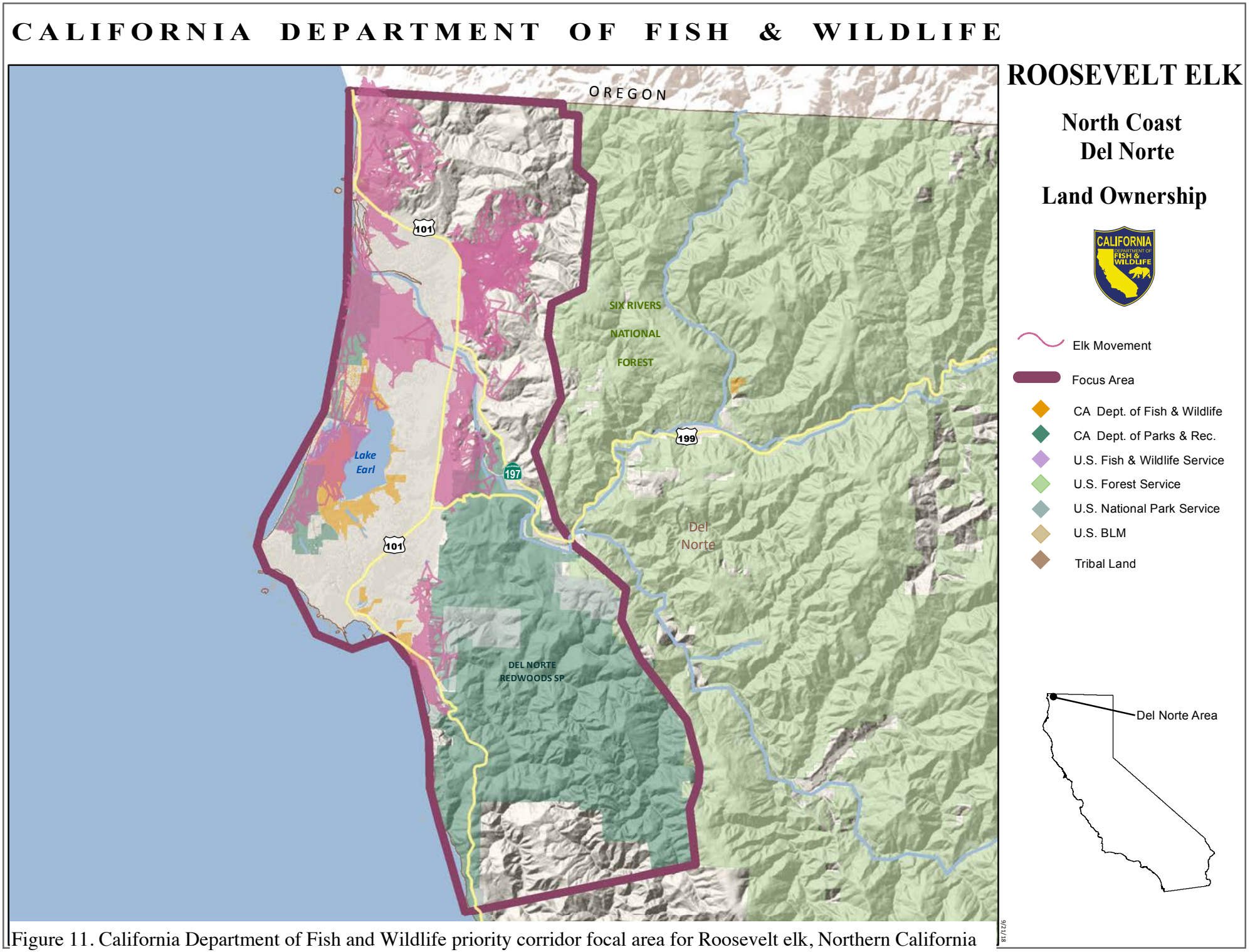
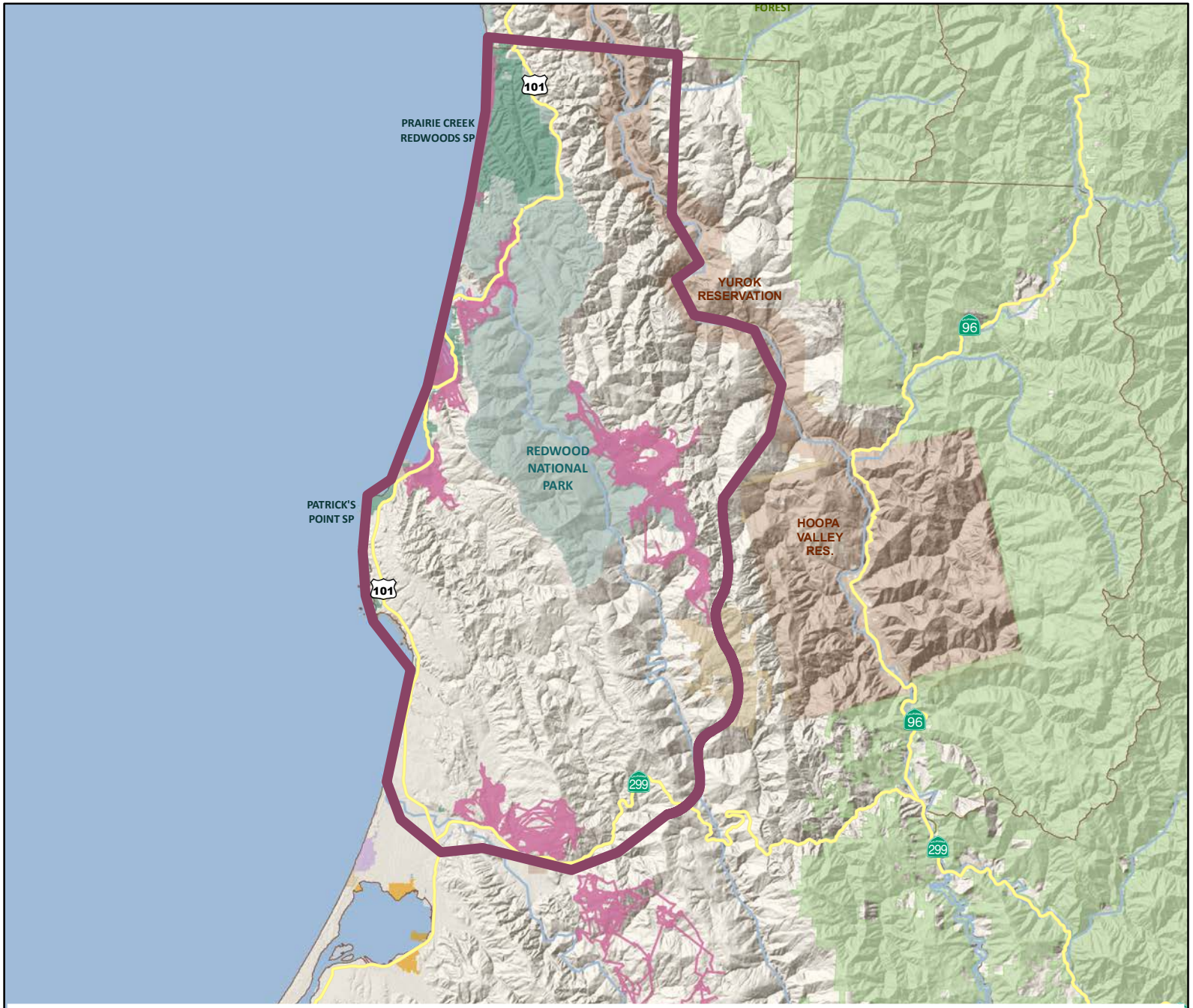


Figure 11. California Department of Fish and Wildlife priority corridor focal area for Roosevelt elk, Northern California Coast Ecoregion, North Coast Province, Northwestern Elk Hunt Zone depicting land management agency jurisdiction.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



ROOSEVELT ELK

North Coast Humboldt

Land Ownership

Elk Movement

Focus Area

CA Dept. of Fish & Wildlife

CA Dept. of Parks & Rec.

U.S. Fish & Wildlife Service

U.S. Forest Service

U.S. National Park Service

U.S. BLM

Tribal Land

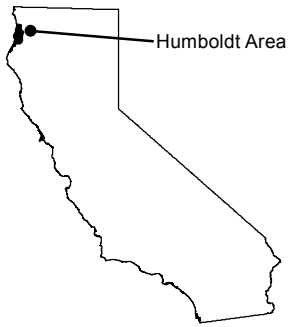


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Figure 12. California Department of Fish and Wildlife priority corridor focal area for Roosevelt elk, Northern California Coast Ecoregion, North Coast Province, Northwestern Elk Hunt Zone depicting dominant vegetation cover type.

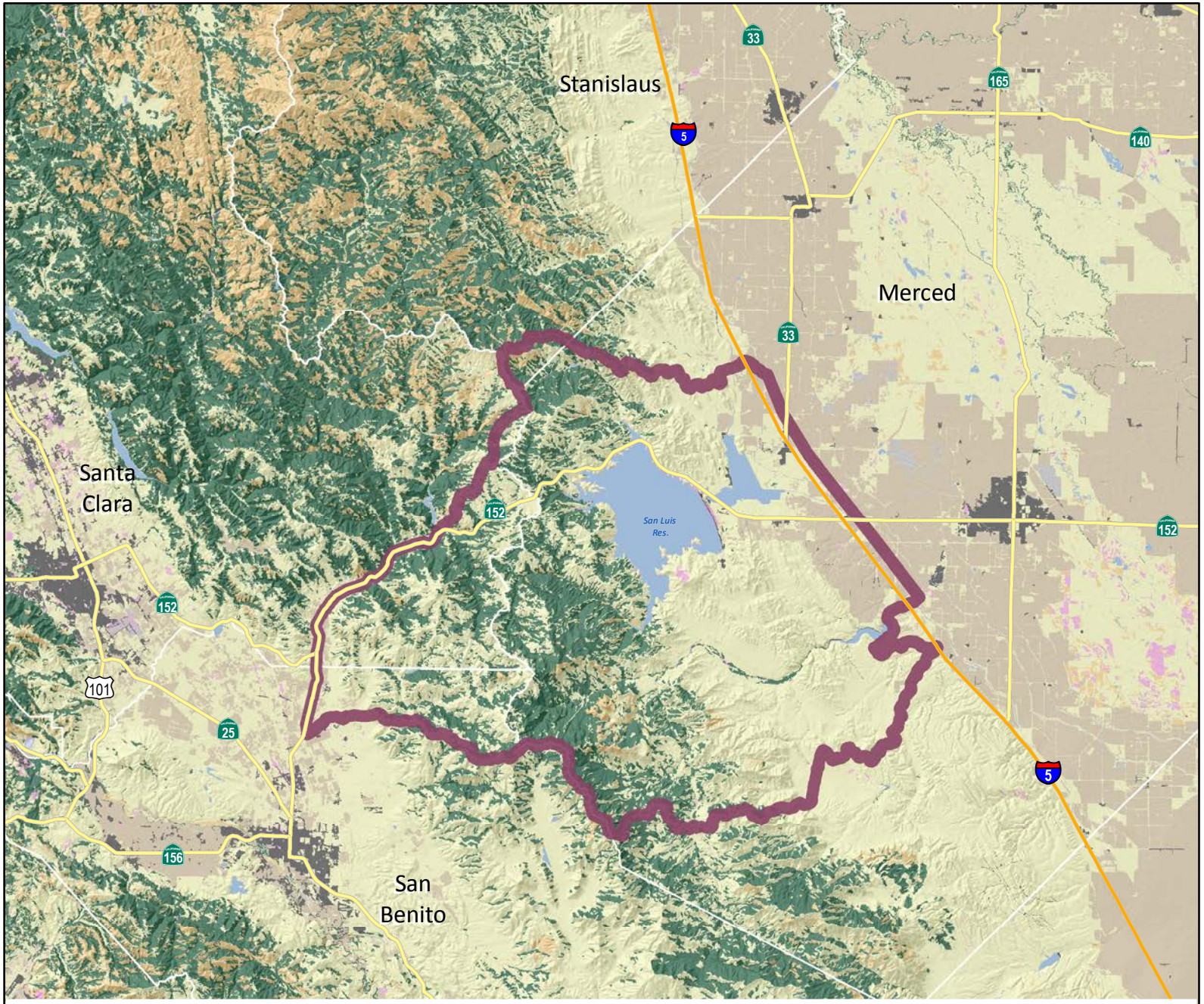
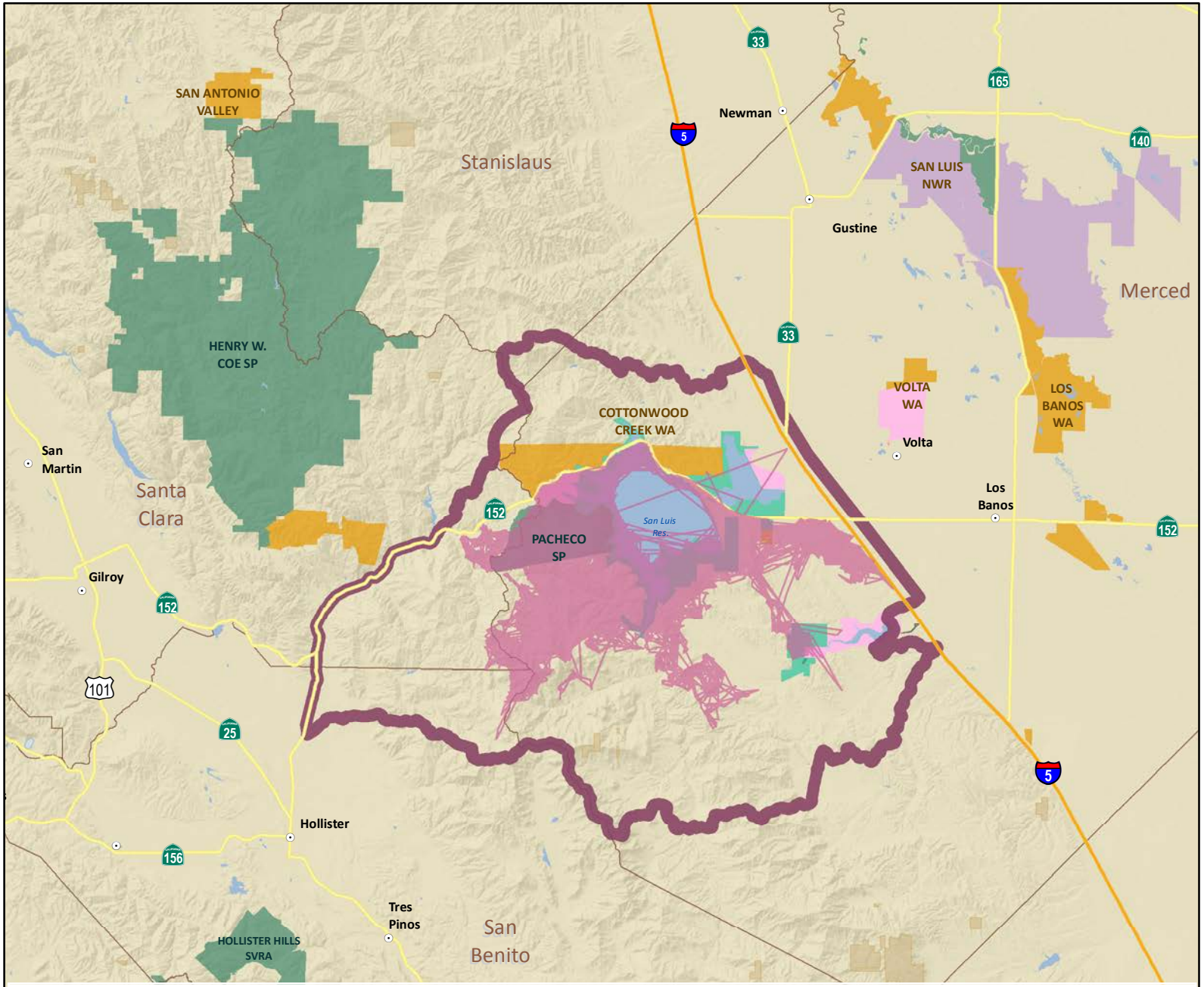


Figure 13. California Department of Fish and Wildlife priority corridor focal area for Tule elk, Central Valley and Sierra Nevada Province and Bay Delta and Central Coast Province, San Luis Reservoir Elk Hunt Zone depicting dominant vegetation cover type.

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE



TULE ELK
San Luis Reservoir
Land Ownership

- Focus Area
- Elk Movement 2017
- CA Dept. of Fish & Wildlife
- CA Dept. of Parks & Rec.
- U.S. Fish & Wildlife Service
- U.S. Forest Service
- U.S. National Park Service
- U.S. BLM
- U. S. Department of Defense
- CDWR
- US BOR
- Other Federal

10/4/2018

Figure 14. California Department of Fish and Wildlife priority corridor focal area for Tule elk, Central Valley and Sierra Nevada Province and Bay Delta and Central Coast Province, San Luis Reservoir Elk Hunt Zone depicting land management agency jurisdiction.

Appendix A. Secretarial Order 3362

ORDER NO. 3362

Subject: Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors

Sec. 1 **Purpose**. This Order directs appropriate bureaus within the Department of the Interior (Department) to work in close partnership with the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming to enhance and improve the quality of big-game winter range and migration corridor habitat on Federal lands under the management jurisdiction of this Department in a way that recognizes state authority to conserve and manage big-game species and respects private property rights. Through scientific endeavors and land management actions, wildlife such as Rocky Mountain Elk (elk), Mule Deer (deer), Pronghorn Antelope (pronghorn), and a host of other species will benefit. Additionally, this Order seeks to expand opportunities for big-game hunting by improving priority habitats to assist states in their efforts to increase and maintain sustainable big game populations across western states.

Sec. 2 **Authorities**. This Order is issued under the authority of section 2 of Reorganization Plan No. 3 of 1950 (64 Stat. 1262), as amended, as well as the Department's land and resource management authorities, including the following:

a. Federal Land Policy and Management Act of 1976, as amended, 43 U.S.C. 1701, *et seq*.;

b. U.S. Geological Survey Organic Act, as amended, 43 U.S.C. 31, *et seq*.;

c. National Wildlife Refuge System Improvement Act of 1997, as amended, 16 U.S.C. 668dd *et seq*.; and

d. National Park Service Organic Act of 1916, as amended, 54 U.S.C. 100101, *et seq*.

Sec. 3 **Background**. The West was officially “settled” long ago, but land use changes continue to occur throughout the western landscape today. Human populations grow at increasing rates with population movements from east and west coast states into the interior West. In many areas, development to accommodate the expanding population has occurred in important winter habitat and migration corridors for elk, deer, and pronghorn. Additionally, changes have occurred across large swaths of land not impacted by residential development. The habitat quality and value of these areas crucial to western big-game populations are often degraded or declining.

The Bureau of Land Management (BLM) is the largest land manager in the United States (U.S.) with more than 245 million acres of public land under its purview, much of which is found in Western States. The U.S. Fish and Wildlife Service (FWS) and National Park Service (NPS) also manage a considerable amount of public land on behalf of the American people in the West. Beyond land management responsibilities, the Department has strong scientific capabilities in the U.S. Geological Survey (USGS) that can be deployed to assist State wildlife agencies and Federal land managers. Collectively, the appropriate bureaus within the Department have an opportunity to serve in a leadership role and take the initiative to work closely with Western States on their priorities and objectives as they relate to big-game winter range and migration corridors on lands managed by the Department.

Consistent with the American conservation ethic, ultimately it is crucial that the Department take action to harmonize State fish and game management and Federal land management of big-game winter range and corridors. On lands within these important areas, if landowners are interested and willing, conservation may occur through voluntary agreements.

Robust and sustainable elk, deer, and pronghorn populations contribute greatly to the economy and well-being of communities across the West. In fact, hunters and tourists travel to Western States from across our Nation and beyond to pursue and enjoy this wildlife. In doing so, they spend billions of dollars at large and small businesses that are crucial to State and local economies. We have a responsibility as a Department with large landholdings to be a collaborative neighbor and steward of the resources held in trust.

Accordingly, the Department will work with our State partners and others to conserve and/or improve priority western big-game winter range and migration corridors in sagebrush ecosystems and in other ecotypes as necessary. This Order focuses on the Western States of: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. These States generally have expansive public lands with established sagebrush landscapes along with robust big-game herds that are highly valued by hunters and tourists throughout the Nation.

The Department has broad responsibilities to manage Federal lands, waters, and resources for public benefit, including managing habitat to support fish, wildlife, and other resources. Secretary's Order 3356, "Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes, and Territories," (SO 3356) was issued on September 15, 2017. SO 3356 primarily focused on physical access to lands for recreational activities, particularly hunting and fishing. This Order is focused on providing access to big game animals by providing direction regarding land management actions to improve habitat quality for big-game populations that could help ensure robust big-game populations continue to exist. Further, SO 3356 includes a number of directives related to working with States and using the best available science to inform development of guidelines, including directing relevant bureaus to:

a. Collaborate with State, tribal, and territorial fish and wildlife agencies to attain or sustain State, tribal, and territorial wildlife population goals during the Department's land management planning and implementation, including prioritizing active habitat management

projects and funding that contributes to achieving wildlife population objectives, particularly for wildlife that is hunted or fished, and identifying additional ways to include or delegate to States habitat management work on Federal lands;

b. Work cooperatively with State, tribal, and territorial wildlife agencies to enhance State, tribe, and territorial access to the Department's lands for wildlife management actions;

c. Within 180 days, develop a proposed categorical exclusion for proposed projects that utilize common practices solely intended to enhance or restore habitat for species such as sage grouse and/or mule deer; and

d. Review and use the best available science to inform development of specific guidelines for the Department's lands and waters related to planning and developing energy, transmission, or other relevant projects to avoid or minimize potential negative impacts on wildlife.

This Order follows the intent and purpose of SO 3356 and expands and enhances the specific directives therein.

Sec. 4 **Implementation**. Consistent with governing laws, regulations, and principles of responsible public stewardship, I direct the following actions:

a. With respect to activities at the national level, I hereby direct the BLM, FWS, and NPS to:

(1) Within 30 days, identify an individual to serve as the "Coordinator" for the Department. The Coordinator will work closely with appropriate States, Federal agencies, nongovernmental organizations, and/or associations to identify active programs focused on big-game winter range and/or migration corridors. The programs are to be organized and cataloged by region and other geographic features (such as watersheds and principles of wildlife management) as determined by the Deputy Secretary, including those principles identified in the Department's reorganization plan.

(2) Within 45 days, provide the Coordinator information regarding:

(i) Past and current bureau conservation/restoration efforts on winter range and migration corridors;

(ii) Whether consideration of winter range and corridors is included in appropriate bureau land (or site) management plans;

(iii) Bureau management actions used to accomplish habitat objectives in these areas;

(iv) The location of areas that have been identified as a priority for conservation and habitat treatments; and

(v) Funding sources previously used and/or currently available to the bureau for winter range and migration corridor conservation/restoration efforts.

(3) Within 60 days, if sufficient land use plans are already established that are consistent with this Order, work with the Coordinator and each regional Liaison (see section 4b) to discuss implementation of the plans. If land use plans are not already established, work with the Coordinator and each regional Liaison to develop an Action Plan that summarizes information collected in section 4 (a) (1) and (2), establishes a clear direction forward with each State, and includes:

(i) Habitat management goals and associated actions as they are associated with big game winter range and migration corridors;

(ii) Measurable outcomes; and

(iii) Budgets necessary to complete respective action(s).

b. With respect to activities at the State level, I hereby direct the BLM, FWS, and NPS to:

(1) Within 60 days, identify one person in each appropriate unified region (see section 4a) to serve as the Liaison for the Department for that unified region. The Liaison will coordinate at the State level with each State in their region, as well as with the Liaison for any other regions within the State. The Liaison will schedule a meeting with the respective State fish and wildlife agency to assess where and how the Department can work in close partnership with the State on priority winter range and migration corridor conservation.

(2) Within 60 days, if this focus is not already included in respective land management plans, evaluate how land under each bureau's management responsibility can contribute to State or other efforts to improve the quality and condition of priority big-game winter and migration corridor habitat.

(3) Provide a report on October 1, 2018, and at the end of each fiscal year thereafter, that details how respective bureau field offices, refuges, or parks cooperated and collaborated with the appropriate State wildlife agencies to further winter range and migration corridor habitat conservation.

(4) Assess State wildlife agency data regarding wildlife migrations early in the planning process for land use plans and significant project-level actions that bureaus develop; and

(5) Evaluate and appropriately apply site-specific management activities, as identified in State land use plans, site-specific plans, or the Action Plan (described above), that conserve or restore habitat necessary to sustain local and regional big-game populations through measures that may include one or more of the following:

(i) restoring degraded winter range and migration corridors by removing encroaching trees from sagebrush ecosystems, rehabilitating areas damaged by fire, or treating exotic/invasive vegetation to improve the quality and value of these areas to big game and other wildlife;

(ii) revising wild horse and burro-appropriate management levels (AML) or removing horses and burros exceeding established AML from winter range or migration corridors if habitat is degraded as a result of their presence;

(iii) working cooperatively with private landowners and State highway departments to achieve permissive fencing measures, including potentially modifying (via smooth wire), removing (if no longer necessary), or seasonally adapting (seasonal lay down) fencing if proven to impede movement of big game through migration corridors;

(iv) avoiding development in the most crucial winter range or migration corridors during sensitive seasons;

(v) minimizing development that would fragment winter range and primary migration corridors;

(vi) limiting disturbance of big game on winter range; and

(vii) utilizing other proven actions necessary to conserve and/or restore the vital big-game winter range and migration corridors across the West.

c. With respect to science, I hereby direct the USGS to:

(1) Proceed in close cooperation with the States, in particular the Western Association of Fish and Wildlife Agencies and its program manager for the Crucial Habitat Assessment Tool, prior to developing maps or mapping tools related to elk, deer, or pronghorn movement or land use; and

(2) Prioritize evaluations of the effectiveness of habitat treatments in sagebrush communities, as requested by States or land management bureaus, and identified needs related to developing a greater understanding of locations used as winter range or migration corridors.

d. I further hereby direct the responsible bureaus and offices within the Department to:

(1) Within 180 days, to update all existing regulations, orders, guidance documents, policies, instructions, manuals, directives, notices, implementing actions, and any other similar actions to be consistent with the requirements in this Order;

(2) Within 30 days, provide direction at the state or other appropriate level to revise existing Federal-State memorandums of agreement to incorporate consultation with State agencies on the location and conservation needs of winter range and migration routes; and

(3) Consult with State wildlife agencies and bureaus to ensure land use plans are consistent and complementary to one another along the entire wildlife corridor in common instances where winter range or migration corridors span jurisdictional boundaries.

e. Heads of relevant bureaus will ensure that appropriate members of the Senior Executive Service under their purview include a performance standard in their respective current or future performance plan that specifically implements the applicable actions identified in this Order.

Sec. 5 **Management**. I hereby direct the Deputy Secretary to take is responsible for taking all reasonably necessary steps to implement this Order.

Sec. 6 **Effect of Order**. This Order is intended to improve the internal management of the Department. This Order and any resulting reports or recommendations are not intended to, and do not create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its departments, agencies, instrumentalities or entities, its officers or employees, or any other person. To the extent there is any inconsistency between the provision of this Order and any Federal laws or regulations, the laws or regulations will control.

Sec. 7 **Expiration Date**. This Order is effective immediately. It will remain in effect until its provisions are implemented and completed, or until it is amended, superseded, or revoked.

Secretary of the Interior

Date: