



## **LMAC Prospectus:**

### **Investigating Factors Regulating Black-tailed Deer Populations in Western Siskiyou County**

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**Proposed Start Date:** January 2012

**Proposed Completion Date:** June 2017

#### **Executive Summary including Statement of Need**

The black-tailed deer has markedly declined throughout much of its range in recent years (Lee Rue 1997, Pamplin et al. 2001, Gilbert and Raedeke 2004, ODFW 2008, CDFG unpublished data). Despite the importance of this species for providing significant recreational opportunities and contributing substantially to local economies, detailed information on its population dynamics or ecology is lacking. In Siskiyou County, declines in deer have prompted interest in understanding factors limiting populations and criticism of the Department's hunt programs.

In 2007, the Siskiyou County Board of Supervisors convened a technical working group to develop the first County-sponsored deer management plan in California. This plan was developed due to frustrations with the Department of Fish and Game and other state and federal agencies' perceived failure to address declines in Siskiyou County deer populations. The Siskiyou Board of Supervisors subsequently passed a resolution to actively encourage, develop, and implement cooperative strategies and projects geared toward research, restoration, and sustainability of abundant, healthy deer herds.

This prospectus outlines a comprehensive investigation into underlying causes that regulate black-tailed deer populations in western Siskiyou County. It will significantly enhance the Department's management, conservation, and public information and outreach activities involving black-tailed deer.

#### **Introduction**

Black-tailed deer in Siskiyou County provide important public recreational opportunities and contribute substantially to the local economy. Despite the importance of this species, relatively little is known of black-tailed deer population dynamics or ecology in northern California. In 2007, the Siskiyou County Board of Supervisors authorized the Siskiyou County Fish and Game Commission to convene a technical working group to develop a deer management plan for the County.

According to the County's management plan released the following year, its development was prompted due to mounting frustrations with the Department of Fish and Game and other state and federal agencies' failure to address declining deer

populations. In 2009, the Siskiyou County Board of Supervisors passed a resolution to actively encourage, develop and help implement cooperative strategies and projects geared toward research, restoration and sustainability of abundant, healthy deer herds in the County (Res. #09-105).

Deer populations in northern California and throughout much of the state have declined significantly since their peak in the mid 20<sup>th</sup> century. Factors associated with declines of black-tailed deer remain largely speculative, but habitat quality and quantity has long been suspected as major contributors (Longhurst et al. 1976). Efforts by land management agencies to improve habitats for deer in Siskiyou County have been limited, but extensive wildfires in the last decade have converted nearly 500,000 acres of forested landscapes to early seral communities. These events, which typically would be expected to improve habitat quality for deer, appear to have had little effect on population trends, and raised questions on the ultimate factors responsible for the productivity of black-tailed deer in this region. Detailed investigations are needed to reveal the primary causes that limit populations, and to identify actions to improve their management and conservation.

Hunting opportunity has been substantially reduced in many parts of California in response to declining trends in populations (Loft 1998). Although hunting opportunity has been restricted in many X zones, the Department has been criticized for being too liberal with respect to tag quotas and season lengths in Zone B6 in Siskiyou County as well as other B zones. In the Northern Region, harvest management in the form of bucks only hunting has been primarily based on limited surveys to estimate population trends, herd composition, and hunter success. Little research has been conducted to determine factors that limit populations, the effects of current harvest strategies on population dynamics, or habitat use. This information is needed to: (1) examine important issues related to landscape health and conservation; (2) implement effective management actions benefiting deer populations; and (3) provide for appropriate public use of the deer resource.

### **Objectives**

- Determine factors limiting black-tailed deer populations in western Siskiyou County.
- Quantify annual rates of survival, natality, fecundity, and recruitment of fawns.
- Estimate rates and causes of mortality in fawns and adults.
- Quantify trends in the physical condition of female deer.
- Investigate relationships among vital rates, physical condition, and habitat characteristics in deer.
- Assess potential effects of the distribution, density, and proportion of the adult population of male deer on reproductive synchrony in female deer.
- Document habitat use and identify movement corridors and seasonal ranges to assess the effects of land-use and habitat condition on deer.
- Develop predictive habitat suitability models for black-tailed deer in western Siskiyou County.
- Inform land management agencies proposing actions that may affect deer habitat, and evaluate the potential implications of climate change on deer in this region.

## **Methods**

- Sixty adult female deer will be captured annually and fitted with GPS, VHF, and VIT transmitters during a 5-year study period using helicopter net gunning, drive nets, clover traps, or free-range darting.
- Sixty fawns will be captured annually and equipped with transmitters attached to ear tags or expandable collars.
- Captures will be distributed throughout the study area in an effort to achieve independence among samples.
- Study animals will be monitored intensively using ground surveillance or fixed-wing aircraft.
- Movements of females during the pre-rut, rut, and post-rut periods will be intensively monitored with pre-programmed GPS collars.
- Causes of mortality will be determined by examination of carcasses, evidence gathered on site, and using DNA.
- Body condition, fetal rates, and conception dates will be determined for adult females using ultrasonography.
- Biological samples will be collected from adult females to assess the prevalence of disease and evaluate health. Ectoparasites will be collected and identified.
- Incisors will be collected from adult females for aging, and all animals will be weighed.
- Age-specific survival rates will be modeled to identify patterns in population performance.
- Spatial data collected from GPS collars will be used to document habitat use, distribution, and movements of deer. These data will facilitate the development of predictive habitat suitability models for black-tailed deer in western Siskiyou County.

## **Products (and estimated dates of completion)**

- Annual progress reports will be prepared describing preliminary project findings.
- Manuscripts will be submitted for publication at the completion of the study (2017).

## **Collaborators**

- Dr. Pam Swift – Wildlife Investigations Lab
- Steve Torres – Wildlife Investigations Lab
- California Deer Association
- Collaboration with University researchers will be required to finalize the study design, conduct the principal field work, and prepare annual progress reports and publications.

## **Personnel Requirements and Funding from CDFG**

A detailed research prospectus will be prepared and submitted to the Wildlife Branch, Large Mammal Advisory Committee (LMAC), and the Big Game Advisory Committee for review. Northern Regional Wildlife Management personnel will assist and supervise the work of graduate students, field technicians, volunteers, and oversee all project activities. The California Deer Association has committed \$30,000 to support a graduate student to work on aspects of this project. Opportunities for additional funding sources are being explored.

## **Budget Estimate**

Itemized Budget (5 years):

- \$420,000 -- 120 Transmitters (Adult real-time GPS)
- \$60,000 -- 60 GPS refurbishments
- \$75,000 -- 300 Transmitters (Adult VHF)
- \$75,000 -- 300 Transmitters (Fawn VHF)
- \$75,000 -- 300 Transmitters (Adult VIT)
- \$425,000 -- Stipend for graduate students and field technicians
- \$75,000 -- Salary for Principal Investigator
- \$50,000 -- Miscellaneous equipment
- \$20,000 -- Laboratory expenses (incisors, blood, necropsies)
- \$300,000 -- Flight time (helicopter captures)
- \$25,000 -- Flight time (fixed-wing monitoring)
- \$75,000 -- Operating expense (vehicle maintenance and fuel)

**Total 5-year cost = \$1,675,000**

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Annual Cost Estimates	\$449,000	\$239,000	\$449,000	\$299,000	\$239,000	\$1,675,000

## **Issues to be Resolved**

Approval of the Prospectus by LMAC and the Wildlife Branch and review by the Big Game Advisory Committee  
Preparation and approval of a detailed Study Proposal via LMAC and the Wildlife Branch  
Selection of Principal Investigator  
Selection of graduate students and field technicians  
Securing helicopter contractor

## **Literature Cited**

Gilbert, B.A. and K.J. Raedeke. 2004. Recruitment dynamics of black-tailed deer in the western Cascades. *Journal of Wildlife Management* 68: 120-128.

Lee Rue, L. 1997. *Deer of North America*.

Loft, E. 1998. Economic contribution of deer, pronghorn antelope, and sage grouse hunting to northeastern California and implications to the overall "value" of wildlife. *California Wildlife Conservation Bulletin* no. 11. 42p.

Longhurst W.M., E.O.Garton, H.F. Heady and G.E. Connolly. 1976. The California deer decline and possibilities for restoration. *Cal-Neva Wildlife Transactions* 1976.

Oregon Department of Fish and Wildlife. 2008. *Black-tailed Deer Management Plan*.

Pamplin, N., R. Schmitz, and D. Jackson. 2001. Columbian black-tailed deer birth site identification and neonate survival in western Oregon. *Proceedings 2001 Deer/Elk Workshop*.

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