



Large Mammal Advisory Committee

Pronghorn Distribution, Movements, and Habitat use in Northeastern California

Proposed Start and Completion Date

Captures are planned beginning in the winter of 2012/2013 and will be conducted annually through the winter of 2015/2016, when conditions are suitable for helicopter net gunning operations. The final report and publication of project results will be completed by December 31, 2018.

Executive Summary

California's pronghorn population increased through the 1970's (Salwasser and Shimamoto 1979), 1980's and early 1990's. The winter of 1992/1993 reduced the population by almost half, and their numbers remain near that level today (CDFG unpublished data). Population recovery has not occurred as expected, raising questions regarding habitat quality, carrying capacity, and other factors potentially limiting pronghorn in northeastern California. This proposed study will update information regarding pronghorn distribution within summer and winter ranges, location of migration corridors, migratory behavior, impediments to migration, and important seasonal habitat areas within occupied range in northeastern California. Health assessments of individual animals captured will also reveal important information regarding potential nutritional and mineral deficiencies, diseases, pregnancy rates and other vital rates.

Statement of Need

California's pronghorn population has contracted both in range and in number since Europeans first arrived in the west. Historically, California's pronghorn population exceeded 500,000 animals and their range included much of the Central Valley, and down to and even below sea level in parts of the state (Figure 1). Today, pronghorn occupy the northeastern corner of the California with small, isolated populations existing in parts of the Central Valley.

Pronghorn in California are a high profile species that contribute significantly to California's northeastern rural economy (Loft 1997). Contemporary information regarding migratory behavior, herd composition, kid survival, changes in seasonal distribution, and vegetation changes on summer and winter range is needed to effectively manage and conserve this population.

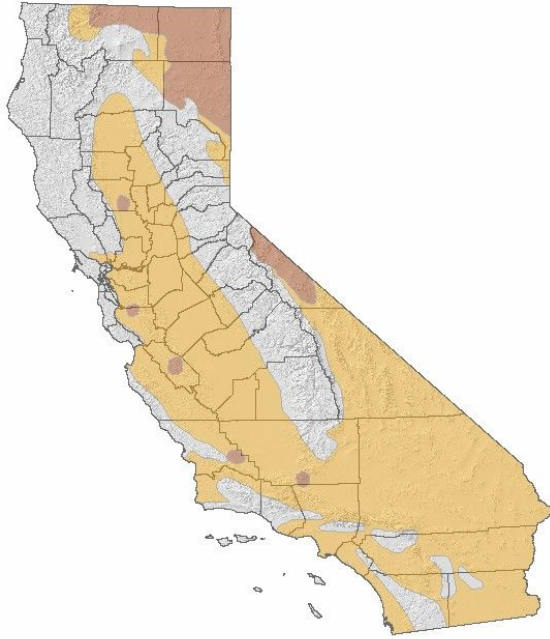


Figure 1. Pronghorn antelope range in California (McLean, 1944).

Prior to the winter of 1992/1993, the pronghorn population in northeastern California approximated 8,000 animals (CDFG unpublished data) and was increasing. That winter, the population was reduced by almost 50% and their numbers remain near that level presently. Questions regarding carrying capacity, health of the population, reproductive rates, kid survival and other limits to the population are raised as a result of the lack of recovery.

Although the Department has conducted annual winter survey flights for pronghorn in northeastern California since 1942, relatively little is known

regarding factors potentially limiting population growth and how herds which congregate on common winter ranges redistribute to summer ranges where they are hunted. Contemporary information regarding herd composition, kid survival, changes in seasonal distribution, vegetation changes on summer and winter range is needed to effectively manage and conserve this population.

Subdivisions, fencing, agricultural and/or energy development projects have occurred or are in planning stages throughout northeast California. Rural county planning commissions often demand information regarding wildlife and natural resource information before considering these resources as part of planned development projects. Older data are sometimes ignored or trivialized. Updated information will improve our ability to identify conflicts to wildlife and habitats in the early stages of planned development projects. Effective mitigation measures for planned projects could be developed as a result of improved data. Information obtained from this study will be used by the Department to assist with conservation planning efforts throughout pronghorn range and enhance management of this high profile wildlife species within the state.

Introduction

California's pronghorn population increased through the 1970's (Salwasser and Shimamoto 1979), 1980's and early 1990's. The winter of 1992/1993 reduced the population by almost half, and their numbers remain near level today (CDFG unpublished data).

It is not known at this time if carrying capacity, nutritional deficiencies, predation, disease, kid survival, or other factors, acting individually or in combination has

limited population recovery since 1992/1993. Changes in vegetation (primarily increased invasive annual grasses and western juniper expansion) and increased development by man within pronghorn range are suspected to have negatively affected populations in the region. Agricultural crops frequented by pronghorn are common within the proposed study area. It is known that some agricultural crops benefit pronghorn, yet little information exists regarding the health and productivity of animals in these areas compared to those where agriculture is less likely to be encountered.

Most of the past work conducted on pronghorn in northeastern California consisted of annual winter surveys. Winter surveys have been conducted since 1942, and were initiated to improve upon the results obtained through surveys conducted on foot and by horseback (McLean 1944). Summer herd composition counts were also conducted for many years (although not since the early 2000's) and provided buck:doe and fawn:doe ratio data. Our long history of conducting annual winter surveys has provided important information regarding pronghorn population trend in northeastern California, but little is known of pronghorn ecology in this region.

Although the Department has decades of data collected from summer herd composition flights and annual winter surveys, changes in habitats have raised questions regarding distribution of pronghorn within these ranges. Habitat changes associated with fire suppression, succession, invasive plants, agriculture, subdivisions, and other human developments affect local pronghorn populations. This study will significantly enhance the Department's knowledge of pronghorn distributions within seasonal ranges and we anticipate in the discovery of undocumented sites important to the species.

Using state-of-the-art GPS technology, this project will provide the quantified details of landscape occupancy, dispersal, and temporal/spatial distributions for pronghorn in northeastern California. Moreover, GPS data will help prioritize the private land conservation values of this region, and impart baseline knowledge of ecosystem function for gauging future impacts from changing climatic conditions. This project will address data gaps and provide contemporary information regarding distribution on seasonal ranges and improve our ability to address resource issues and improve pronghorn management in California.

Objectives

The goal of this project is to gain a better understanding of pronghorn ecology in northeastern California in order to enhance the Department's ability to manage and conserve this species. Specific objectives of this study are to:

- Identify core reproductive areas, critical ranges, migration corridors, habitat use, and temporal-spatial distributions of pronghorn in northeastern California.
- Monitor annual patterns of survival, causes of mortality, and factors that influence survival of neonatal, juvenile, and adult female pronghorn.

- Assess the health of pronghorn within the project area.

Methods

The project will occur within current pronghorn range within northeastern California. This area includes portions of the Modoc Plateau, Southern Cascade, Great Basin, and Intermountain semi-desert provinces (USDA 1994). Habitat types within this area include sagebrush steppe, juniper woodlands, montane valleys, and agriculture.

University graduate students will be employed and will assist with capture efforts, data collection and analysis, and report writing. Specific methods designed to meet objectives will be included in individual student study proposals

The most efficient method to capture desired numbers of animals will utilize a helicopter to net gun pronghorn. Under ideal conditions, cool winter temps and snow on the ground, this technique has proven reliable and has been implemented with minimal losses of pronghorn. The Nevada Department of Wildlife has reported pronghorn mortality rates of approximating 2-5% in recent helicopter net gunning operations (Chris Hampson pers. comm.). Free-range darting may also be used to capture pronghorn under the direction of the Wildlife Investigations Laboratory (WIL).

Up to 100 adult female antelope (25 per year) will be captured among the six management units in the Northern Region. Once the capture objectives are met in one unit, the capture operation will be moved to the next site to capture additional animals. Captured pronghorn will be fitted with a GPS and VHF collar.

Data collected from radio-marked animals will assist in determination of migration corridors (Berger 2003) and timing. This sample of animals will also help determine if migrations are obligatory or conditional. Radio-marked animals will enhance our ability to locate them during summer and winter surveys, potentially reducing flight time and risk to observers. Important migration corridors will be identified and will assist with conservation planning efforts in the Northern Region. Knowledge of distribution within summer and winter ranges will be improved.

Pregnancy rates will be determined via progesterone levels detected in blood serum. Researchers will observe radio-marked females after parturition to determine kid to doe ratios and kid survival. Opportunities to capture and mark pronghorn kids (with ear tag transmitters and/or breakaway collars) within days of birth will provide vital information regarding fawn survival. Up to 25 pronghorn kids will be captured per year for four years and fitted with ear tag transmitters and/or breakaway collars.

Health assessments of captured pronghorn will be conducted similar to Dunbar et al. 1999. Blood (jugular venipuncture) and fecal samples will be collected from a proportion of adult does and kids captured. Physiological parameters related to nutrition and diseases will be evaluated and include blood urea nitrogen (BUN),

serum copper, blood, and liver selenium levels. Disease testing will include identification of antibodies to *Brucella* spp., *Leptospira interrogans*, bluetongue virus, epizootic hemorrhagic disease, respiratory syncytial virus, parainfluenza virus type 3, infectious bovine rhinotracheitis, and bovine viral diarrhea.

In addition to WIL veterinary staff, local veterinarians from the Modoc Veterinary Clinic have expressed interest in assisting with the study. Pre-veterinary students from nearby universities (Oregon State, U.C. Davis, and University Nevada Reno) and others will also be solicited as to their interest and availability in assisting with the project. When conditions are suitable, it may be necessary to begin captures on short notice.

Graduate students and/or scientific aids will monitor radio-marked animals following capture and will focus primarily on Department questions regarding populations, health assessments, and habitat use. Up to 25 adult and fawn pronghorn will be captured and monitored during the first four years of the study. A fifth year of monitoring will occur during FY 2016/2017. Other, focused research proposed by individual professors and their students may also be developed in concert with Department objectives for the study.

Data obtained from this study will be used by the Department to assist with conservation planning efforts throughout pronghorn range and to enhance management of this high profile wildlife species within the state. Department databases will be updated and maintained by regional staff and the Biogeographic Data Branch.

Products

Progress reports will be prepared annually by Department regional staff. They will evaluate progress towards meeting project objectives and discuss any changes in the study design that may be warranted. Annual reports will include migration information, updates on seasonal distributions, survival, production, health assessments and other information related to the study objectives. A final report describing the study methods, results, and containing a detailed discussion of project findings will be completed and provided to the Resource Assessment Program and posted on the Department's web site. Peer reviewed publications will result from this study including graduate level theses and publications in professional journals. All spatial data collected during the project and databases will be provided to the Wildlife and Habitat Data Analysis Branch

Collaborators

- Project Supervision: Richard Callas, Senior Environmental Scientist
- Project Lead: Richard Shinn, Environmental Scientist - capture coordination, telemetry monitoring, data analysis, report preparation
- Environmental Scientists Brian Ehler, Robert Schaefer, Pete Figura, Scott Hill –field support, data analysis and report preparation
- Brett Furnas, Environmental Scientist – assistance with statistical design and data analysis, and report publication

- Dr. Ben Gonzales – WIL, Wildlife Veterinarian
- Joe Hobbs , Staff Environmental Scientist, Wildlife Programs Branch
- USDA Forest Service, Modoc, Lassen, and Klamath National Forests
- Bureau of Land Management
- Universities and graduate students to be determined.

Issues to be Resolved

Final Department approval is needed to continue project planning to develop contracts needed to support capture operations and to develop agreements with University researchers and their students to collaborate in the study.

Required Products

Annual progress reports will be prepared by regional wildlife program staff. These reports will be prepared by 31 December during all project years (2013-2017). A final report will be prepared by regional staff and will be available by December 31, 2018. Expected publications resulting from this study include masters level theses and peer-reviewed publications in professional journals.

Personnel Requirements and commitments from CDFG

To minimize handling time of captured pronghorn, contractors conducting net-gunning helicopter operations will attach radio collars, collect blood, and fecal samples. As a result, the number of Department personnel needed to assist with pronghorn captures will be minimized.

Budget Detail

BUDGET CATEGORY	RATE	Unit	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	Project Total
PERSONNEL SERVICES								
Contract Graduate Advisor	\$80	100 hours/year	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$40,000
Graduate Student/Scientific Aid (4)	\$23.23	13.34/hour plus benefits (35%) and overhead (29%) for 4408 hours/year	\$102,398	\$102,398	\$102,398	\$102,398	\$102,398	\$511,989
Subtotal: Personal Services			\$110,398	\$110,398	\$110,398	\$110,398	\$110,398	\$551,989
OPERATING AND EXPENSE								
ATS Iridium satellite collars	\$2,495	\$2,495/collar	\$62,375	\$62,375	\$62,375	\$62,375		\$249,500

VHF transmitters (adult pronghorn)	\$240	each	\$6,000	\$6,000	\$6,000	\$6,000		\$24,000
ATS breakaway/eag tags VHF collars	\$204	\$204/collar	\$5,100	\$5,100	\$5,100	\$5,100		\$20,400
Capture Contract (Helicopter and crew)	\$500	each	\$12,500	\$12,500	\$12,500	\$12,500		\$50,000
Miscellaneous Equipment Purchases			\$5,000	\$5,000	\$5,000	\$5,000	\$3,000	\$23,000
Vehicles, Fuel, Maintenance	\$0.55	4 vehicles @31,500 miles/year	\$16,775	\$16,775	\$16,775	\$16,775	\$16,775	\$83,875
Subtotal: Operating Equipment and Expense			\$107,750	\$107,750	\$107,750	\$107,750	\$19,775	\$450,775
Project Subtotal			\$218,148	\$218,148	\$218,148	\$218,148	\$130,173	\$1,002,764
TOTAL FUNDS REQUESTED								\$1,002,764

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Personal Communication

Chris Hampson, Nevada Department of Wildlife game biologist, March 2012.