

**Project Summary**  
**Rocky Mountains Cooperative Ecosystem Studies Unit**

**Project Title:** Effects of Chronic Wasting Disease on Elk Population Dynamics in Rocky Mountain National Park

**Discipline:** Natural  
**Type of Project:** Research  
**Funding Agency:** National Park Service  
**Other Partners/Cooperators:** Colorado State University  
**Effective Dates:** 9/1/2010 - 6/1/2016  
**Funding Amount:** \$46,609

**Investigators and Agency Representative:**

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**Project Abstract:** Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy that occurs in deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) in Rocky Mountain National Park (RMNP). It was first identified in RMNP in 1981 and, until recently, estimates of prevalence from harvested elk in the region ranged from 3-5% (unpublished data, Colorado Division of Wildlife). Recent work indicates CWD prevalence in elk from RMNP is at least 11%, and may be as high as 15-25% (unpublished data from 2007-2009, NPS BRMD). Because this disease is always terminal once contracted, CWD represents a significant source of mortality for the elk in the RMNP region. However, the effects of CWD on elk population processes in RMNP have not been estimated or described.

It is of paramount importance to determine how CWD is influencing population dynamics because RMNP has recently embarked on an intensive elk and vegetation management program that includes culling elk inside and encouraging hunter harvest of elk adjacent to the park to maintain specified population sizes in the region (600-800 elk in park, 1,000 to 1,300 in Estes Park area; RMNP Elk and Management EIS 2007). Annual population estimates and the estimated effects and uncertainty of future culling options are made by Dr. Hobbs, but these do not model the effects of CWD. Thus, there is no understanding of how CWD is affecting elk population processes. This is critical to understand because elk population sizes in and around RMNP have declined by >40% in the last seven years. These decreases in population size occurred prior to the onset of new management actions (e.g., culling, large-scale fencing). It has been speculated that the decline is due to increased hunter harvest, lower food availability, and migration out of the Estes Valley; however, none of these metrics has been examined in a quantitative fashion. Thus, evaluating the role of CWD relative to these other potential causes of decline has emerged as a fundamental need.

A variety of critical questions remain unanswered with regard to CWD and elk in RMNP. First, what is the current effect of CWD and other factors on elk population processes within and adjacent to RMNP? Second, what is the true estimate of prevalence and incidence for CWD? Third, is CWD increasing, and if so, what effect will this have on elk population processes in the future? The products of this Task Order will help the NPS address these questions in a three phase process. First, we will use existing data to create a population model that estimates the potential effects of chronic wasting disease (CWD) on elk population processes in Rocky Mountain National Park (RMNP). The data sources that will be used in this effort were not collected for the explicit purpose of such a model, but the data and model will provide a sound basis to summarize what is known and what is uncertain in a modern, statistical framework. It will also allow us to develop a comprehensive, multi-year study plan that will obtain specific field and disease data from the elk population in RMNP (Phase I). Second, we will institute this research in the field with design and statistical assistance from Dr. Hobbs (Phase II). Third, once field work is underway/completed by NPS and Dr. Hobbs, population and disease models will be further refined to provide specific information (e.g., incidence, trends in prevalence) and predictions of future disease impacts and associated uncertainties (Phase III).

**Outcomes with Completion Dates:** Phase I - June 1, 2011; Phase II - December 31, 2013; Phase III - June 1, 2016

**Keywords:** elk population, Chronic Wasting Disease, Rocky Mountain National Park, Colorado State University