



JANUARY 2006

WHERE HAVE ALL THE RABBITS GONE?

Summary and Recommendations from a Workshop Held in Grand Teton
National Park – September 23-24, 2005

By Joel Berger, Kim Murray Berger, Peter F. Brussard,
Robert Gibson, Janet Rachlow, and Andrew Smith



The Wildlife Conservation Society

The Wildlife Conservation Society (WCS) is dedicated to saving wildlife and wildlands to assure a future for threatened species like elephants, tigers, sharks, macaws, or lynx. That mission is achieved through a conservation program that protects some 50 living landscapes around the world, manages more than 300 field projects in 53 countries, and supports the nation's largest system of living institutions – the Bronx Zoo, the New York Aquarium, the Wildlife Centers in Central Park, Queens, and Prospect Park, and the Wildlife Survival Center on St. Catherines Island, Georgia. We are developing and maintaining pioneering environmental education programs that reach more than three million people in the New York metropolitan area as well as in all 50 United States and 14 other countries. We are working to make future generations inheritors, not just survivors.

To learn more about WCS visit www.wcs.org.

WCS has been an active force in North American conservation since 1895. Bison reintroduction, legislation to protect endangered wildlife, and the establishment of more than twenty parks and reserves were early WCS accomplishments. Pioneering studies of bighorn sheep, elk, cougars, and wolves all benefited from WCS support. Today the WCS North America Program takes a science-based approach to conservation in more than forty projects in twenty-one states and provinces. Key issues include reserve creation, wildlife monitoring and recovery, ecosystem restoration, integrated landscape management, and community-based conservation.

To contact the North American Program write to: nap@wcs.org.

January 2006

Where Have All The Rabbits Gone?

Summary and Recommendations from a Workshop Held in
Grand Teton National Park – September 23-24, 2005

Joel Berger¹, Kim Murray Berger¹, Peter F. Brussard², Robert Gibson³,
Janet Rachlow⁴, and Andrew Smith⁵

¹ Teton Field Office, Wildlife Conservation Society, PO Box 985, Victor, ID 83455

² Department of Biology, MS 314, University of Nevada, Reno, NV 89557

³ School of Biological Sciences, 348 Manter Hall, University of Nebraska-Lincoln,
Lincoln, NE 68588-0118

⁴ Department of Fish & Wildlife Resources, University of Idaho, Moscow, ID 83844

⁵ School of Life Sciences, Arizona State University, Tempe, AZ 85282-4501



2300 Southern Boulevard
Bronx, NY 10460

Wildlife Conservation Society
International Conservation
2300 Southern Boulevard
Bronx, New York 10460-1099 USA
Telephone: (718) 220-5155
Fax: (718) 364-4275
<http://www.wcs.org>

SUGGESTED CITATION:

Berger, J., et al. 2006. Where Have All The Rabbits Gone? Summary and Recommendations from a Workshop Held in Grand Teton National Park – September 23-24, 2005. Available for download from <http://www.wcs.org/yellowstone>.

COVER PHOTO: Joel Berger © 2005

COPYRIGHT:

The contents of this paper are solely the property of the authors and cannot be reproduced with the permission of the authors.

WHERE HAVE ALL THE RABBITS GONE?

CONTENTS

ACKNOWLEDGEMENTS.....	4
WORKSHOP PARTICIPANTS.....	4
WHY HOLD A WORKSHOP?.....	5
CONTEXT AND BACKGROUND.....	5
WORKSHOP GOALS.....	7
HIGHLIGHTS	7
Evidence for Occurrence and Extirpation.....	7
Hypotheses for the Loss of White-tailed Jackrabbits from GTNP	8
A Serious Information Gap.....	10
GENERAL SYNOPSIS AND RECOMMENDATIONS.....	10
LITERATURE CITED.....	11

LIST OF FIGURES

FIGURE 1. WHITE-TAILED JACKRABBIT SIGHTINGS IN GRAND TETON NATIONAL PARK.	8
FIGURE 2. LOCATIONS OF WHITE-TAILED JACKRABBIT SIGHTINGS IN THE VICINITY OF JACKSON HOLE	9

ACKNOWLEDGEMENTS

This workshop would not have been possible without generous support from Earth Friends Wildlife Foundation and the Community Foundation of Jackson Hole. Steve Cain, senior biologist, Grand Teton National Park, and Dr. Hank Harlow, director of the University of Wyoming – National Park Service Research Center, the AMK Ranch, kindly agreed to make facilities available. Leigh Work and Louise Lasley of the Teton Field Office of the Wildlife Conservation Society were especially adept at handling logistical issues. Both the state and federal agencies and participants themselves graciously shared their time and freely offered critical insights to guide the discussions. Franz Camenzind most amiably shared his historical wisdom and photos.

WORKSHOP PARTICIPANTS

Joel Berger, Wildlife Conservation Society
Kim Murray Berger, Wildlife Conservation Society
Joe Bohne, Wyoming Game and Fish Department
Peter F. Brussard, University of Nevada, Reno
Steve L. Cain, National Park Service
Franz Camenzind, Jackson Hole Conservation Alliance
Eric Cole, U.S. Fish and Wildlife Service
Don DeLong, U. S. Forest Service
Sarah Dewey, National Park Service
Craig Groves, Wildlife Conservation Society
Robert Gibson, University of Nebraska-Lincoln
Hank Harlow, University of Wyoming
Louise Lasley, Wildlife Conservation Society
Kelly McCloskey, National Park Service
Bob Oakleaf, Wyoming Game and Fish Department
Susan Patla, Wyoming Game and Fish Department
Janet Rachlow, University of Idaho
Andrew Smith, Arizona State University
Sue Wolff, National Park Service
Leigh Work, Wildlife Conservation Society

WHY HOLD A WORKSHOP?

Within Wyoming are found eight members of the rabbit family known as lagomorphs. Three -- snowshoe hares, pikas, and white-tailed jack rabbits -- are listed among the fauna of Grand Teton National Park (GTNP). Between 1970 and 2005, only three sightings of live white-tailed jackrabbits in Jackson Hole have been substantiated (details below) despite decades of field studies on numerous other species. Historic observations beginning with Olaus Murie in 1928 (handwritten field notes, Teton Science School archives, Kelly, WY) and followed by professional mammalogists, James Findley and Norm Negus (Pers. Comm.), confirm that these hares once existed in GTNP. The fact that less than half a dozen observations in 35 years have been detected in GTNP and in other regions of Jackson Hole raises a red flag about the health of the sage-steppe ecosystem.

With this information in mind, the Wildlife Conservation Society approached the National Park Service and the University of Wyoming about the possibility of holding a 1-day workshop at their joint research station, the AMK Ranch; they graciously agreed to host the meeting. Sixteen local biologists and four outside research experts (Dr. Peter Brussard, Dr. Robert Gibson, Dr. Janet Rachlow, Dr. Andrew Smith) including the Chair of the World Conservation Union's (IUCN) Lagomorph Specialist Group (Smith) participated in the workshop.

CONTEXT AND BACKGROUND

The ecological role of the majority of mammals remains mysterious, a gap that is particularly true for rabbits throughout most North American ecosystems. Snowshoe hares are the single exception. In the Yukon they are a keystone species responsible for modifying predatory dynamics of raptors and coyotes and for altering prey survival (Krebs et al 2001). For other members of the rabbit family there is dearth of information. This void makes it difficult to assess just how hares and rabbits affect ecosystem health. For instance, where hares are now absent it is virtually impossible to know if, or how, the abundance of other herbivores and predators responds or the extent to which the abundance of rabbits affects prey selection by predators.

Our collective ignorance is of more than passing interest. Indeed, there are both economic and aesthetic costs that hinder prudent decisions about land management and biological diversity. At least four reasons exist for seeking to understand the health of sage-steppe ecosystems within the context of rabbits. First, ecological dynamics affect many species, not the least of which is the sage grouse, a species petitioned for listing as endangered by the U.S. Fish and Wildlife Service. Second, the National Park Service is under a formal mandate to restore biological diversity in national parks when a loss is due to human-induced circumstances and prospects for success appear good. Third, the loss of rabbits and hares from the sagebrush landscapes of western North America is linked to coyote predation rates on domestic sheep; when numbers of hares are low, rates of predation on domestic stock increase (Stoddart et al. 2001). Finally, given that jackrabbit abundance has a positive economic impact on livestock via changes in depredation rates, it appears likely (although yet untested) that their presence also affects the survival of



Photo: J. Berger © 2005

neonatal ungulates. That is, because coyotes are generalist predators they are sensitive to prey abundance, and therefore alter their preferences as one species declines. For instance, predation rates on juvenile pronghorn are exceptionally high in Grand Teton National Park (K. Berger 2003), an area where white-tailed jackrabbits have been functionally extinct since 1978. In short, to conserve and manage sagebrush ecosystems requires an understanding not of a single species or even multiple individual species, but rather of their interactions across landscapes and time.

WORKSHOP GOALS

The overarching and immediate goal of the workshop was to understand why white-tailed jack rabbits are currently missing from Jackson Hole, and to evaluate whether a restoration effort was biologically justifiable. As a consequence, participants were asked to address several questions including: 1) What should we evaluate to determine, *a priori*, whether a re-introduction might have a reasonable chance of success? 2) What constitutes a successful re-introduction? and 3) What parameters should be measured to evaluate whether a reintroduction is successful? Critically, participants concentrated on issues related to causes of the loss of jackrabbits from Jackson Hole, how the various hypotheses might be tested, the state-of-knowledge about white-tailed jackrabbits, and the role of lagomorphs in the health of sage-steppe ecosystems.

HIGHLIGHTS

Discussions centered on three primary themes: 1) existing evidence of white-tailed jackrabbit occurrence in both Grand Teton and other areas of Jackson Hole; 2) potential causes of the local extinction, and 3) how best to address questions needed to restore white-tailed jackrabbits within the broader context of ecosystem health.

Evidence for Occurrence and Extirpation

Historic accounts substantiate the existence of unknown numbers of white-tailed jackrabbits within Jackson Hole (Fig. 1; J. Berger, in prep). Beginning in the 1970s, observations were few. Subsequent periodic studies of coyote food habits through 1999 by John Weaver (1977) and Rachel Wigglesworth (2000) revealed a virtual absence of white-tailed jackrabbits in the scats of coyotes. Based on fieldwork and the cumulative experience of more than a dozen biologists and agencies, only a single sighting (on the National Elk Refuge in 1992; Figs. 1 and 2) was documented in Jackson Hole between 1978 and 1997. Since then, two sightings have been confirmed, and a single dead white-tailed jackrabbit was documented at Gros Ventre Junction in 2005 (by Franz Camenzind; Figs. 1 and 2).

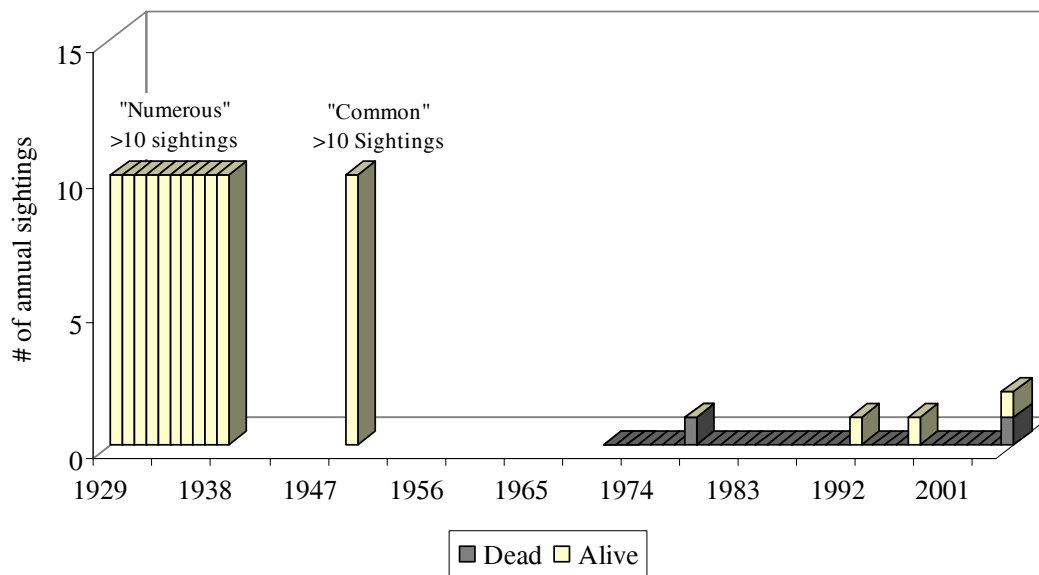


Figure 1. White-tailed jackrabbit sightings in Grand Teton National Park. Data have not been corrected for disparities in sampling effort.

The region closest to Grand Teton National Park with infrequent but regular sightings of white-tailed jackrabbits is the Gros Ventre River Drainage (about 15 - 20 kilometers distant; Fig. 2). This sage-steppe drainage is a corridor through which the Park is most likely colonized. However, infrequent observations in the Park during the past three decades suggest that natural re-colonization is unlikely to occur. That is, although individual hares apparently do reach the Park on occasion (Figs. 1 and 2), the prospect of a sufficient number of animals arriving contemporaneously to establish a viable population appears poor. Whether a translocation of individuals should be viewed as a re-introduction or a population augmentation depends upon the status of hares in the Park. However, from an ecological perspective there is no difference because the current number of hares in the park (if any) is insufficient to play an ecologically functional role.

Hypotheses for the Loss of White-tailed Jackrabbits from GTNP

Given that the hares disappeared from the park unnoticed, workshop members did not spend a great deal of time trying to assign the loss to a specific cause. In essence, any specific hypothesis remains difficult to test. However, numerous potential factors were

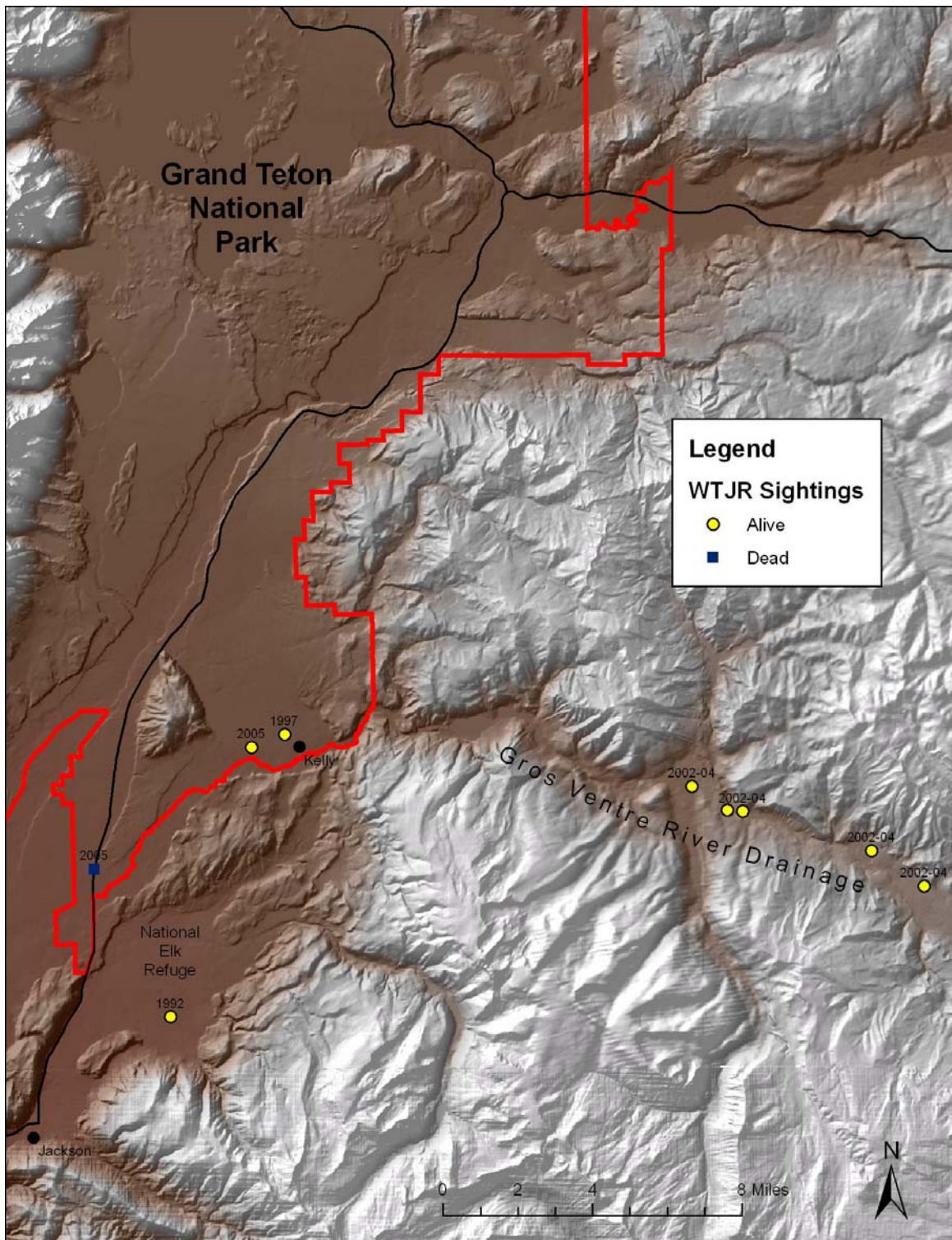


Figure 2. Locations of white-tailed jackrabbit sightings in the vicinity of Jackson Hole, 1997-2005.

inclement weather (e.g., severe winter), disease, predation, human persecution, habitat change, high ungulate biomass, and chance. Participants recognized that white-tailed jackrabbits in GTNP might also have represented a satellite population given the virtual continuous distribution along the Gros Ventre River corridor into the Upper Green River Basin. Furthermore, Jackson Hole may represent the limit of hare range in this region given the extreme climatic conditions.

A Serious Information Gap

Fewer than ten peer-reviewed studies of white-tailed jackrabbits are found in the scientific literature. None of these papers concentrates on the ecological role of this species, and only a single paper on life history exists. Given this substantive lack of information on the species, participants agreed that gathering data on white-tailed jackrabbits was a higher priority, and made more biological sense, than relying on an ecological surrogate for information relevant to a potential re-introduction in GTNP.

GENERAL SYNOPSIS AND RECOMMENDATIONS

The principal goal of this workshop was to discuss the loss of white-tailed jackrabbits and to determine whether a restoration effort was biologically justified. The consensus of the group was that information on this species is insufficient to warrant a restoration at this time. Among the primary thoughts regarding information needs, in no particular order of importance, were:

- Link the loss of white-tailed jackrabbits to the overall health of the sage-steppe ecosystem, both within and beyond the confines of GTNP.
- Examine multi-species relationships, including those among coyotes, hares, sage grouse, pronghorn, golden eagles, ground squirrels, and voles.
- Consider effects of heavy snow and other variables on the corridor that currently links the Gros Ventre drainage to GTNP, and how this may affect hare movements and prospects for natural recolonization.

- Develop a project on white-tailed jackrabbits to collect empirical data on ecology, life-history, demography, and predator-prey relationships. Ideally, a comparative approach contrasting parameters between the Gros Ventre drainage and Upper Green River Basin should be adopted.
- Because two subspecies of jackrabbits exist in western Wyoming, subspecies status in GTNP should be determined using molecular genetic techniques.
- A systematic effort should be undertaken to determine population status and to refine methods of population estimation.
- Vegetation maps and habitat suitability analyses will be needed prior to restoration.
- An assessment of the Holocene fossil record should be conducted to help frame the context for white-tailed jackrabbits and changes in the potential distribution of other species due to non-anthropogenic factors.
- Disease screening should be included as part of any study of hares due to the potential for tularemia and other human health-related concerns.
- The State of Wyoming should remove white-tailed jackrabbits from the list of species classified as ‘varmints’.

Participants agreed that the loss of biological diversity from national parks is an important issue, not just because of a missing element, but because serious ecological consequences are likely to result. Funds should be allocated toward empirical efforts to evaluate demographic restoration and ecosystem health even if investigations beyond park boundaries are required.

LITERATURE CITED

Berger, K. 2003. Pronghorn in peril. *Wildlife Conservation* 106:38-41.

Krebs, C. J., S. Boutin, and R. Boonstra (eds). 2001. *Ecosystem dynamics of the boreal forest; the Kluane Project*. Oxford University Press, New York.

Stoddart, I. C., R. E. Griffiths, and F. F. Knowlton. 2001. Coyote responses to changing jackrabbit abundance affect sheep predation. *J. Range Mgmt.* 54:15-20.

Weaver, J.L. 1977. Coyote-food base relationships in Jackson Hole, Wyoming. M.Sc. thesis, Utah State University, Logan.

Wigglesworth, R.R. 2000. Habitat use, diet, social organization, and seroprevalence of diseases in coyotes (*Canis latrans*) in Grand Teton National Park and suburban/agricultural areas of northwestern Wyoming. M.S. thesis, University of Wyoming, Laramie.