



ESRM 350

The Decline (and Fall?) of the White-tailed Jackrabbit

Autumn 2014

Outline (the 5 Components)

- (1) Background – why leporids are such great study subjects
- (2) About white-tailed jackrabbits
- (3) The conservation problem: where have all the jackrabbits gone?
- (4) The science – what we know, and need to know
- (5) Solution(s)?

1. Background

“All the world will be your enemy...And when they catch you, they will kill you...But first they must catch you...”

- Richard Adams, *Watership Down*



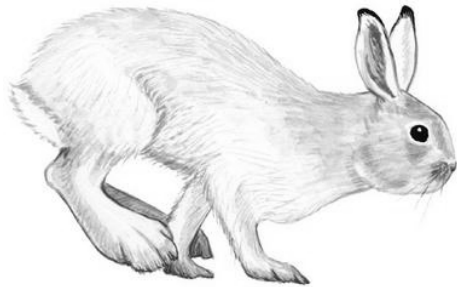
17 years of Leporid Research

- Long-term study: predation as a driver of dynamics in low-density snowshoe hare populations
 - Work began in Idaho (1998); now in northern Okanogan County, WA
 - Led by Laurel!
 - Why snowshoe hares? The ultimate prey species



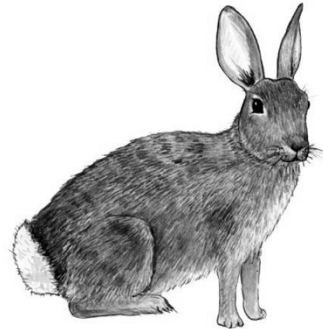
Hares and Rabbits

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Hares...

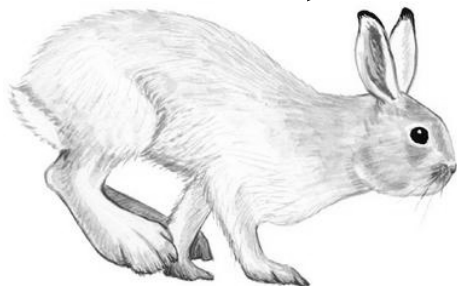
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- Don't live in burrows
- Produce **precocial** young ("leverets")



Rabbits...

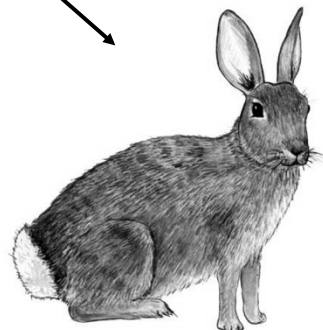
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Where Do Jackrabbits Fit?



Hares...

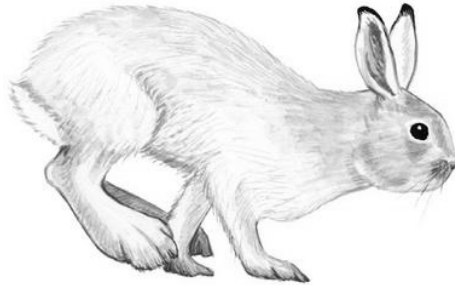
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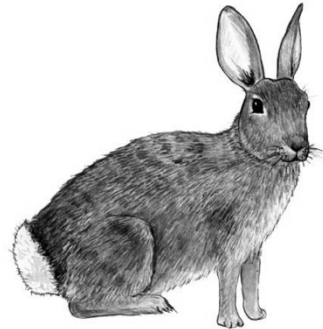
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2. The White-Tailed Jackrabbit

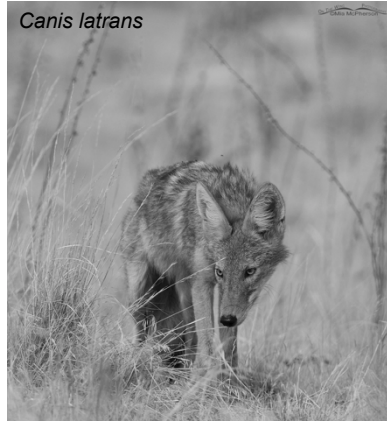


- *Lepus townsendii*
- 3-5 kg (6-10 lbs)
- Generally associated with open prairie (short grasslands)
- Populations in cold areas molt into a white winter coat*
 - do not hibernate
- Herbivorous
 - forbs and grasses in summer; woody browse in winter (e.g., sagebrush)
- Hindgut fermenter
 - Microbial fermentation in the large intestine and cecum
- Coprophagic
- Fecund
 - 2-4 litters/y; 3-6 "leverets" per litter

*Hansen and Bear (1963) *J Mammalogy*

Many Enemies

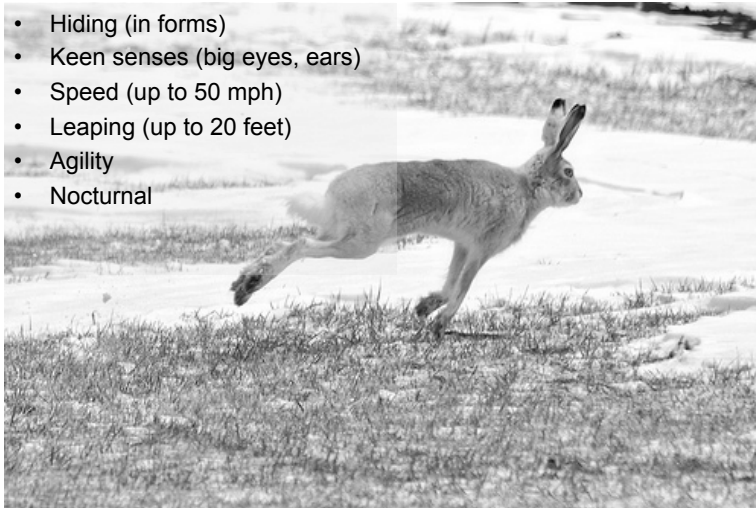
- Important food source for many grassland predators
 - notably: coyotes, foxes, and birds of prey (e.g., golden eagle to the right)



<http://www.youtube.com/watch?v=716IK1o23k8>

Good Defenses

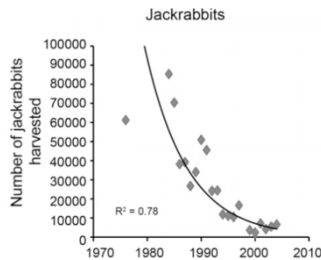
- Hiding (in forms)
- Keen senses (big eyes, ears)
- Speed (up to 50 mph)
- Leaping (up to 20 feet)
- Agility
- Nocturnal



<http://www.arkive.org/white-tailed-jackrabbit/lepus-townsendii/video-00.html>

Rogowitz (1997) *J Mammalogy*

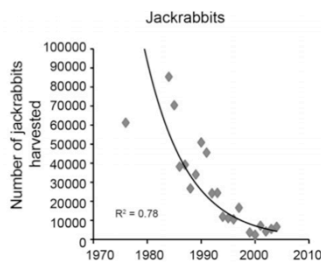
3. The Conservation Problem



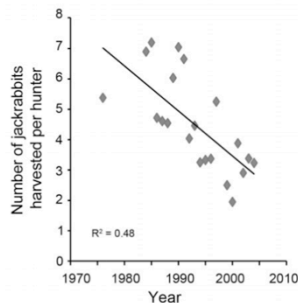
- Across the American west, jackrabbits appear to be in sharp decline
 - Interesting because white-tailed jackrabbits listed as “least concern” by IUCN

Ripple et al. (2013) *Biological Conservation*

3. The Conservation Problem



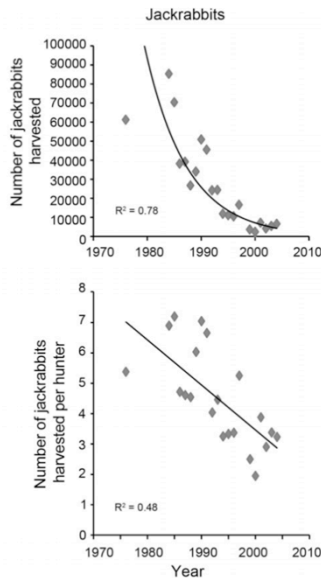
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y-axis metric accounts for hunter effort

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3. The Conservation Problem



- Across the American west, jackrabbits appear to be in sharp decline
 - Interesting because white-tailed jackrabbits listed as “least concern” by IUCN
- The challenge
 - we don't know why

y-axis metric accounts for hunter effort

Ripple et al. (2013) *Biological Conservation*

Jackrabbits Gone From Yellowstone?

- In the Gardiner Valley, WY jackrabbits once a common sight but now rare



Berger (2008) *Oryx*



International Union for the Conservation of Nature (IUCN)

- Lists the white-tailed jackrabbit as “Least Concern”
 - population trend listed as “decreasing”, however
- Why least concern?

<http://www.iucnredlist.org/search>

International Union for the Conservation of Nature (IUCN)

- Lists the white-tailed jackrabbit as “Least Concern”
 - population trend listed as “decreasing”, however
- Why least concern?
- The “shifting baseline syndrome”*

*Pauly (1995) *TREE*

4. What Does Science Say About Possible Culprits?



Possible Culprits: Agriculture?

- White-tailed jackrabbits thrive in open, short- to mid-height grasslands
 - short vegetation facilitates visibility; impedes escape (sprinting)
 - short grasslands maintained by grazing, disturbance

Iowa Department of Natural Resources (2004)

Possible Culprits: Agriculture?

- White-tailed jackrabbits thrive in open, short- to mid-height grasslands
 - short vegetation facilitates visibility; impedes escape (sprinting)
 - short grasslands maintained by grazing, disturbance
- Much of the species' range is cultivated
 - tall crops (corn) reduce habitat quality
 - Recent popularity of corn has exacerbated problem



Iowa Department of Natural Resources (2004)

Possible Culprits: Livestock



1 dot = 10,000 live cattle
1 dot = 308 cattle carcasses per year



1 dot = 1,000 live sheep
1 dot = 31 sheep carcasses per year

Fig. 4. Dot maps showing cattle (left) and sheep (right) live densities and estimated amounts of livestock carrion in the American West as of 2007. For cattle, one dot represents approximately 10,000 live individuals and 308 carcasses per year. For sheep, each dot represents approximately 1000 live individuals and 31 carcasses per year. Based on the density and spatial arrangement of the dots, both livestock and livestock carrion are ubiquitous throughout most of the American West. Both of these sources provide a large and spatially distributed food subsidy to coyotes throughout the West. Carrion carcasses were estimated assuming a 4% rate of annual livestock mortality with 77% of carcasses not being rendered. Source: US Department of Agriculture, National Agricultural Statistics Service and Informa Economics Inc. (2011).

Ripple et al. (2013) *Biological Conservation*

Possible Culprits: Coyote Irruption



- Once a prairie species
 - coyotes are now ubiquitous in North America
 - historical accounts suggest rarity throughout the west*
 - Now, roughly 1 million in the western 11 states alone*



*Ripple et al. (2013) *Biological Conservation*

Possible Culprits: Coyote Irruption



- With short grasslands diminishing
 - Could white-tailed jackrabbit also be succumbing to increasing predation pressure?



*Ripple et al. (2013) *Biological Conservation*

5. Research Needs and Possible Solutions

- The landscape of the American west has changed dramatically
- **Hypothesis one:** white-tailed jackrabbits are in decline because of loss and fragmentation of short-grass prairie
 - What do we need to test it?
 - If supported, what might some policy options be?

5. Research Needs and Possible Solutions

- The landscape of the American west has changed dramatically
- **Hypothesis two:** white-tailed jackrabbits are in decline because of competition with livestock
 - What do we need to test it?
 - If supported, what might some policy options be?

5. Research Needs and Possible Solutions

- The landscape of the American west has changed dramatically
- **Hypothesis two:** white-tailed jackrabbits are in decline because of competition with livestock
 - What do we need to test it?
 - If supported, what might some policy options be?
 - Could grazing be compatible with jackrabbits?*

*Flinders and Hansen (1975) *J Range Management*

5. Research Needs and Possible Solutions

- The landscape of the American west has changed dramatically
- **Hypothesis three:** white-tailed jackrabbits are in decline because of increasing predation by coyotes
 - What do we need to test it?
 - If supported, what might some policy options be?

Coda: Reason for Optimism?

“There are no coyotes in the [Sierra Madre] mountains, whereas with us there is universal complaint from Alaska to New Mexico that the coyote has invaded the high country to wreak havoc on both game and livestock. I submit for conservationists to ponder the question of whether the wolves have not kept the coyotes out? And whether the presence of a normal complement of predators is not, at least in part, accountable for the absence of [coyote] irruption?”

Aldo Leopold (1937) *American Forests*

Coda: Reason for Optimism?



Wolves are on the rise in the west



Coda: Reason for Optimism?



**Coyotes affected
(direct killing by wolves, avoidance,
and?*)**

*Ripple et al. (2013) *Biological Conservation*

Coda: Reason for Optimism?



**Coyotes affected
(direct killing by wolves, avoidance,
and?*)**

***also, dietary shift**

Coda: Reason for Optimism?



Coyotes decline
(reduced predation on jackrabbits
in some areas)

Jackrabbits rebound?
In all areas?