



FIELD REPORT

Dear Wildlife Trails Volunteers,

We would like to thank all of you for your tremendous assistance during the last year. Through your efforts, we were able to gather a very extensive amount of data, which we hope will allow us to answer the major questions that this study is examining.

We are extremely grateful for the care and rigor that all of you displayed in gathering the data and entering it into the computer. The validity of any scientific investigation is dependent upon the quality of the data, and we appreciate your efforts at ensuring that the data gathered were of the highest quality.

We are quite confident that the data that you have gathered will be extremely useful in developing guidelines for designing more effective wildlife corridors and enhancing ecological connectivity between ecological isolates in western North America.

We have learned a tremendous amount from all of you through the discussions we had, and we greatly appreciate your recommendations for improving the project.

Thank you again for your assistance.

Best regards,

Bill and Eric



SECTION ONE

Project Title: Wildlife Trails of the American West

Principal Investigators: Dr William Newmark, Dr Eric Rickart

Research Area: Red Butte Canyon, Wasatch-Cache National Forest, Utah ; Joseph Creek, Beaverhead-Deerlodge National Forest, Montana (40° 46' 52" N, 111° 48' 46" W; 45° 40' 39" N, 113° 52' 41" W)

Date field report completed: 10 May 2010

Period covered by this report: 9 Jun 2009 - 31 Jan 2010

Top Highlight from the Past Field Season

The Wildlife Trails of the American West Project was highlighted this year for its cutting-edge research and its impact on influencing conservation actions worldwide to link protected areas with wildlife corridors in a book entitled *Rewilding the World: Dispatches from the Conservation Revolution* by C. Fraser (2009). The establishment of corridors between protected areas is described as the single most important and revolutionary conservation activity over the last half century to conserve species, ecosystems, and ecological processes.

Non-technical Overview of Results

DATA COLLECTION

Wildlife Trails:

During late May, Earthwatch volunteers on Team 1 assessed the prevalence and distribution of wildlife trails within an expanded study area in Red Butte Canyon.

The January 2010 Team 4 mapped 51 trail segments in Red Butte Canyon.

Carnivore scent station:

Team 3 worked at Joseph Creek during late June, and set up a remote-sensing camera to record carnivores along an elk trail.

Vegetation analysis:

Team 1 recorded percent cover for the ten important food plants in the combined diets of elk (*Cervus canadensis*) and mule deer in 521, 1m X 1m plots along 13 transects. This is an impressive achievement.

Team 3, the late-June team that worked at Joseph Creek, recorded the percent cover of the six most important food plants in the combined diets of elk and mule in 4,494, 1 m X 1 m plots along 26 transects. This is also a truly impressive achievement.

Snow depth:

Volunteers on Team 4 measured the snow depth at 1488 points at 10 m intervals along 14 transects.

RESULTS

In Red Butte Canyon, we determined that animals are more likely to move in open habitat and in regions close to water. Elk and deer trails are also significantly less steep than local terrain. Our results suggest that predator avoidance, water requirements, and energy expenditure are important determinants of elk and deer movement in Red Butte Canyon at an intermediate scale.

Preliminary results from Trail Gulch, which is a winter range site for elk and mule deer migrating from Montana to Idaho, indicate that animals here are more likely to use areas that contain forest cover and are further from water; while at Little Sheep Creek, a migratory site for elk and mule deer, animals here were more likely to use areas with forest cover and to follow ridge tops that parallel drainages.

SECTION TWO: TECHNICAL RESULTS

1. REPORTING ON RESEARCH OBJECTIVES

Objective 1

What are the landscape attributes (e.g. slope, aspect, elevation, cover, food availability, snow depth, and distance to high risk predation zones and water) of wildlife trails?

Progress towards/against Objective

In Red Butte Study Area 1, we have determined that the most important landscape predictors of ungulate movement pathways at a scale of 70m are open habitats and distance to water. We have also determined that elk and deer pathways are significantly less steep than local terrain. Our results indicate that predator avoidance, water requirements, and to a lesser degree energy expenditure are important determinants of elk and deer movement in Red Butte Canyon at an intermediate spatial scale.

In Red Butte Study Area 2, which is a considerably larger study area than Red Butte Study Area 1, we are still gathering data on food availability and ground-truthing cover type maps.

In Trail Gulch, which is a winter range site for the Beaverhead elk population, the best landscape predictors of movement pathways for elk are forest cover and distance to water, suggesting that predator avoidance is the primary determinant of intermediate scale movements on their winter range. At Little Sheep Creek, which is a migratory site for the Beaverhead elk population, the best predictors of movement pathways for elk are forest cover and elevation,

indicating that the primary determinants of migratory movements are avoidance of predation and energetics (elk and deer are following ridgelines while migrating).

At Joseph Creek, we are still gathering data on food availability, ground-truthing cover type maps, and developing summary statistics of landscape features.

Objective 2

How do non-landscape features such as predator distribution and abundance interact with landscape features to affect ungulate movement?

Progress towards/against Objective

Over the next year, we plan to compare landscape predictors of ungulate movement in Red Butte Canyon where the principal predator is the mountain lion with those in the Beaverhead Mountains where the principal predators are the mountain lion and wolf.

Objective 3

How does the relative importance of landscape and non-landscape features vary seasonally?

Progress towards/against Objective

We have developed a preliminary model of ungulate movement in the Red Butte Study Area 1 during the winter when the study site is snow covered. The best landscape predictors of mule, deer and elk movement during this season are open and high cover suggesting that avoidance of predation and thermal regulation are the most important determinants of movement during this season. This result when compared to those presented under Objective 1 indicates that determinants of ungulate movement in Red Butte Study Area 1 vary seasonally.

Objective 4

How does the relative importance of landscape and non-landscape features vary with scale of movement?

Progress towards/against Objective

In May 2007, we received a grant from the National Geographic Society to purchase very high resolution (6cm) aerial photography of Red Butte Canyon. We have recently completed hand digitizing all of the wildlife trail segments in Red Butte Canyon, and over the next 12 months we plan to complete the assessment of food availability and ground-truthing of cover height in the remainder of the canyon. Over the next two years, we plan to develop and compare predictive models of ungulate movement pathways in Red Butte Canyon at 70m and 210m spatial scales.

2. PARTNERSHIPS

The National Geographic Society provided a grant to William Newmark and Eric Rickart to purchase very high resolution aerial photography of Red Butte Canyon.

The DIGIT laboratory at the University of Utah has managed the GIS database and has developed summary statistics of landscape parameters for each of the study sites.

The Wildlife Nutrition Laboratory at Washington State University has conducted a diet analysis for elk and mule deer at each of the study sites.

The U.S. Forest Service wildlife biologists have recommended study sites on the Salmon-Challis National Forest in Idaho and the Beaverhead-Deerlodge National Forest in Montana.

The Utah Water Conservancy, U.S. Forest Service, and the Department of Biology at the University of Utah have provided permission to the PI's to conduct research in Red Butte Canyon Research Natural Area.

The Utah Museum of Natural History has provided logistical support.

3. PROJECT DEVELOPMENT

3.1. Removed or Modified Objectives

N/A

3.2. New Objectives

N/A

4. DISSEMINATION

Printed:

Newmark, W.D. and Rickart, E.A. (in review). High-use movement pathways and habitat selection by ungulates. *Mammalian Biology*.

Mass Media:

Fraser, C. 2009. *Rewilding the World: Dispatches from the Conservation Revolution*. Metropolitan Books.

5. CAPACITY DEVELOPMENT AND EDUCATION

Earthwatch Scholarship Recipients: Erin Hennessey, Kelly LeSage. Both recipients gained tremendously from the experience.

6.1. CONTRIBUTIONS TO INTERNATIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

N/A

6.2. CONTRIBUTIONS TO LOCAL, NATIONAL AND REGIONAL CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

N/A

7. ACTIONS OR ACTIVITIES THAT ENHANCE NATURAL AND SOCIAL CAPITAL

N/A

8. LONG TERM IMPACT OF PROJECT

N/A