

Past and Current Research on Natural Resource Issues in the Blue Mountains

- **Recreation, Hunting, Access**
- **Livestock Production (and Wild Ungulate Ecology)**
- **Restoration**
- **Timber Harvest, Production**
- **Biodiversity, T&E Species**
- **Wildland Disturbances**
- **Water Resources**



Past and Current Research on Natural Resource Issues in the Blue Mountains

- **Community Sustainability**
- **Governance, Public Collaboration**
- **Climate Change**



Starkey Experimental Forest and Range

- **Past Studies of Wildland Disturbances**
 - **Silviculture and Timber Management**
 - **Fire and Fuels**
 - **Livestock Grazing**
 - **Wild Ungulate Herbivory**
 - **Hunting**
 - **Other Recreation**
 - **Roads and Traffic**
 - **Insect Pests**
 - **Vegetation Dynamics**
 - **Non-native Plants**

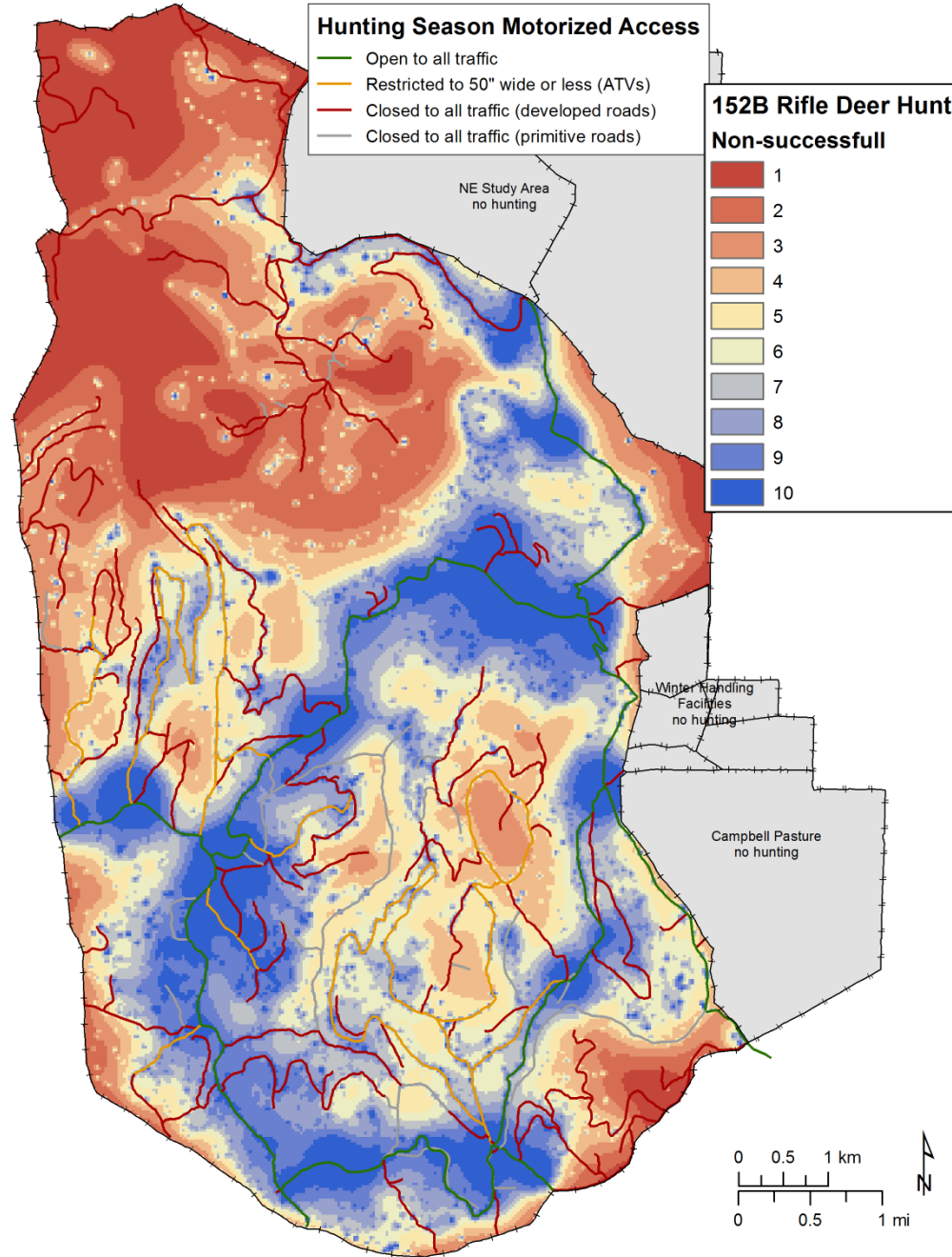


Recreation, Hunting, Access Research

- Deer and Elk Hunting
- Roads and Traffic
- Off-Road Recreation
- Hunter Surveys
- Other Recreation Surveys

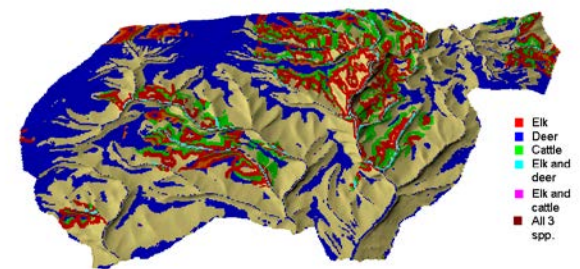


Starkey Experimental Forest and Range



Livestock, Wild Ungulate Research

- Beef Cattle Production
- Wild-Domestic Ungulate Herbivory Effects
- Wild-Domestic Ungulate Interactions, Competition
- Cattle Grazing, Elk Herbivory, and Riparian Recovery
- Elk and Cattle Nutrition and Habitat Modeling
- Cougar, Bear, Wolf Predation
- Optimization Models for Allotment Management Plans



Restoration Research

- **Riparian restoration**
 - Meadow Creek, Catherine Creek, Middle Fork John Day River, Camp Creek
- **Rangeland restoration**
 - Invasive Species (Juniper, Cheatgrass)
 - Rehabilitation following wildfire
- **Forest restoration**
 - Fuels reduction
 - Thinning
 - Fire Modeling



Timber Harvest and Production Research

- Intensive Timber Harvest Effects on Ungulates
- Timber Harvest Effects on Vertebrate Spp. of Concern
- Elk-Thermal Cover Relationships
- Limber Jim Multi-Resource Effects
- Silvicultural Prescriptions and Timber Yield
- Timber Yield and Optimization Models



Water Resources

- Long-term Hydrologic Monitoring
- Salmon and Steelhead Recovery Research
- Heat Source Monitoring and Modeling



Long-Term Data Sets for Research

- Climate
- Hydrology
- Vegetation
- Insect Pests
- Coldwater Fish
- Ungulates



Long-Term Data Sets for Research

- **Less time is often required to analyze existing data to gain new knowledge than on new research to collect new data.**
- **Syntheses of existing data are often tedious and time-consuming and don't involve the glamour of field work.**
- **Funding sources often willing to pay for new research rather than fund analyses of current data in new ways.**



Experimental Design Rigor

- **Manipulative landscape experiments with clean treatments and controls, with results that are scalable.**
- **Adaptive management experiments designed and implemented as research-management partnerships.**
- **Diverse science and management partners**

Some Example Knowledge Gaps

- **Silvicultural effects on fish and wildlife**
- **Integrated effects of multiple, interacting wildland disturbances on fuel loading, fire risk and insect pest outbreaks**
- **Riparian restoration effectiveness for salmonid recovery and interacting effects of wild vs. domestic ungulate herbivory**

Some Example Knowledge Gaps

- **Climate change effects on beef cattle production and deer and elk productivity**
- **Silviculture optimization models for meeting multi-resource forest objectives across time and space**
- **Testing new social science methods for effective use of research findings to help address controversial natural resource decisions (e.g., travel management)**

Long-Term Data Example

- **Starkey Project: one of the largest, most comprehensive data set on ungulates ever collected**
 - 25 years of ungulate telemetry data
 - 25 years of associated spatial data
 - 25 years of hunting season data
 - 25 years of animal condition data
 - 25 years of climate data

Science Rigor and Management Utility

- **Multi-disciplinary (integration of multiple resource uses)**
- **Multiple partners (state, private, federal, tribal, university)**
- **Credible (peer-reviewed, refereed journal publications)**
- **Management focus and management partnerships**

Current Starkey Research

- **Meadow Creek stream and riparian restoration for endangered salmonids and other resources.**
- **Hunter motorized access effects on hunting season designs, harvest objectives, and animal energetics, performance, and behavior.**

Current Starkey Research

- **Ecological factors affecting mule deer productivity and their responses to elk density manipulation.**
- **Accelerated forest restoration designs and effects on multi-resource management (fire risk, forest productivity, nutrient cycling, hydrology, wildlife).**

Current Starkey Research

- **Elk nutrition and habitat evaluation models for regional landscape management applications**
 - **Western OR and WA**
 - **Blue Mountains OR and WA**
 - **Clearwater Basin ID**
 - **Western MT**

Current Starkey Research

- **Nutrition and habitat evaluation models for cattle allotment management planning.**
- **Social science evaluation of livestock grazing practices and traditions.**

Current Starkey Research

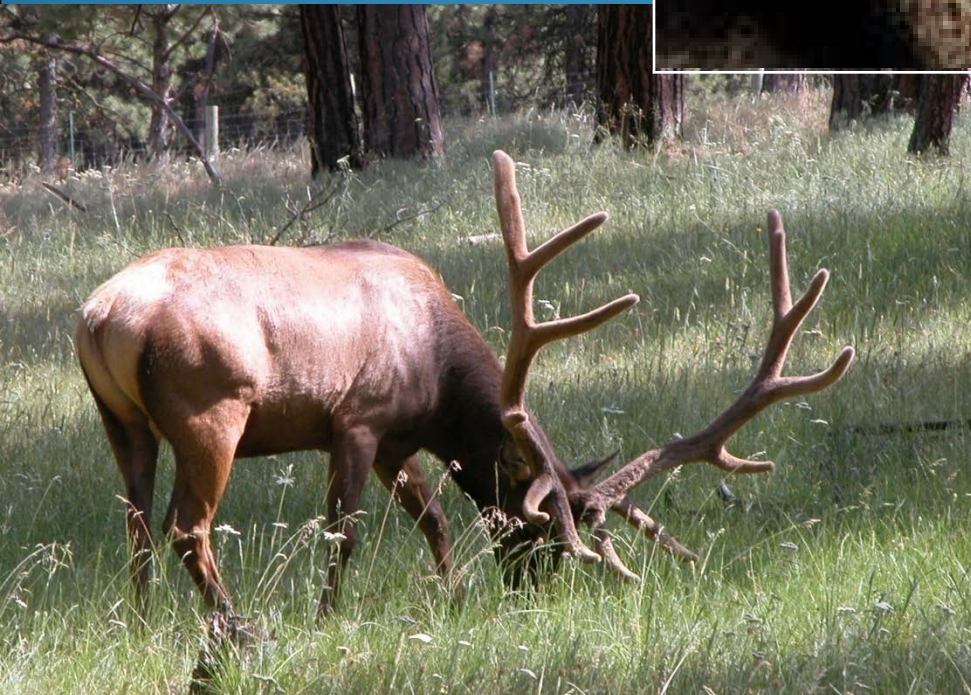
- **Ventenata dubia (African wiregrass) landscape mapping and environmental correlates.**



The Starkey Project:

Long-term Studies of Ungulates, Disturbance Ecology,
and Land Uses in Managed Forests and Rangelands



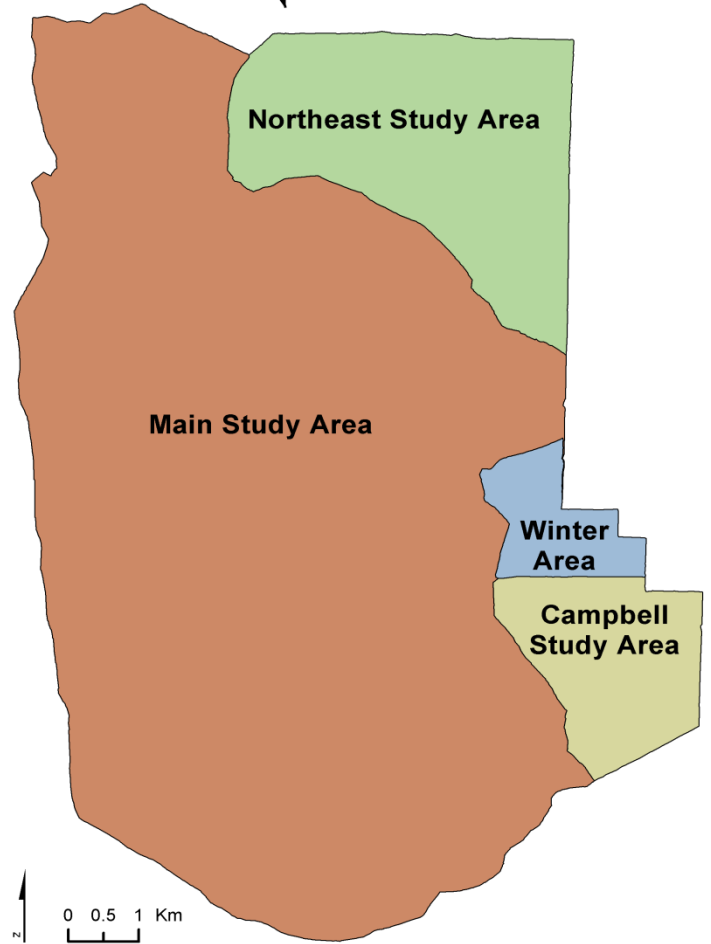
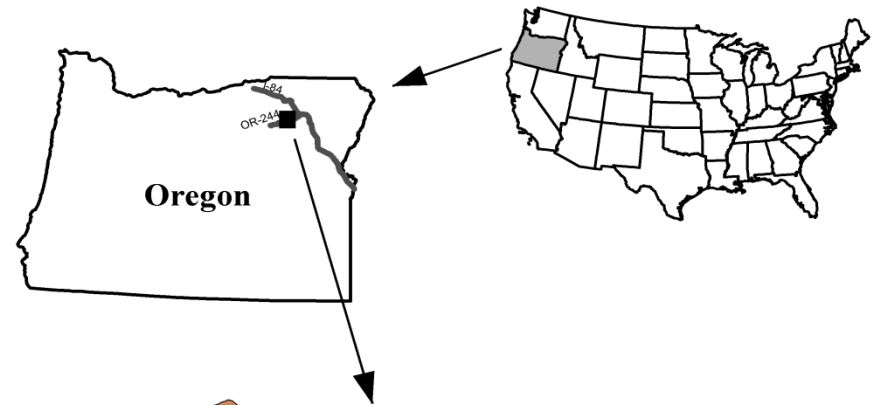




1994 – 2 years after timber harvest



2014 – 20 years after harvest



Timber Management and Thermal Cover Studies

- Land management shifted from the traditional paradigm that focused on the importance of thermal cover to other aspects of ungulate ecology such as nutrition, human disturbance effects, and herbivory.
- This shift saved substantial time and money by removing questionable standards of thermal cover in National Forest planning across the western U.S.
- Results were substantiated in litigation won by the Forest Service.

USDA-FOREST SERVICE
STARKEY EXPERIMENTAL FOREST
MANAGEMENT



