

Managing Western Rangelands with GIS and Remote Sensing

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Research Team

- Sudhanshu Panda, Nancy Glenn, Matthew Germino, Scott Hughes, and Richard Inouye (ISU)
- Steven Seefeldt and Bret Taylor (USSES)
- Numerous grad students

Acknowledgements

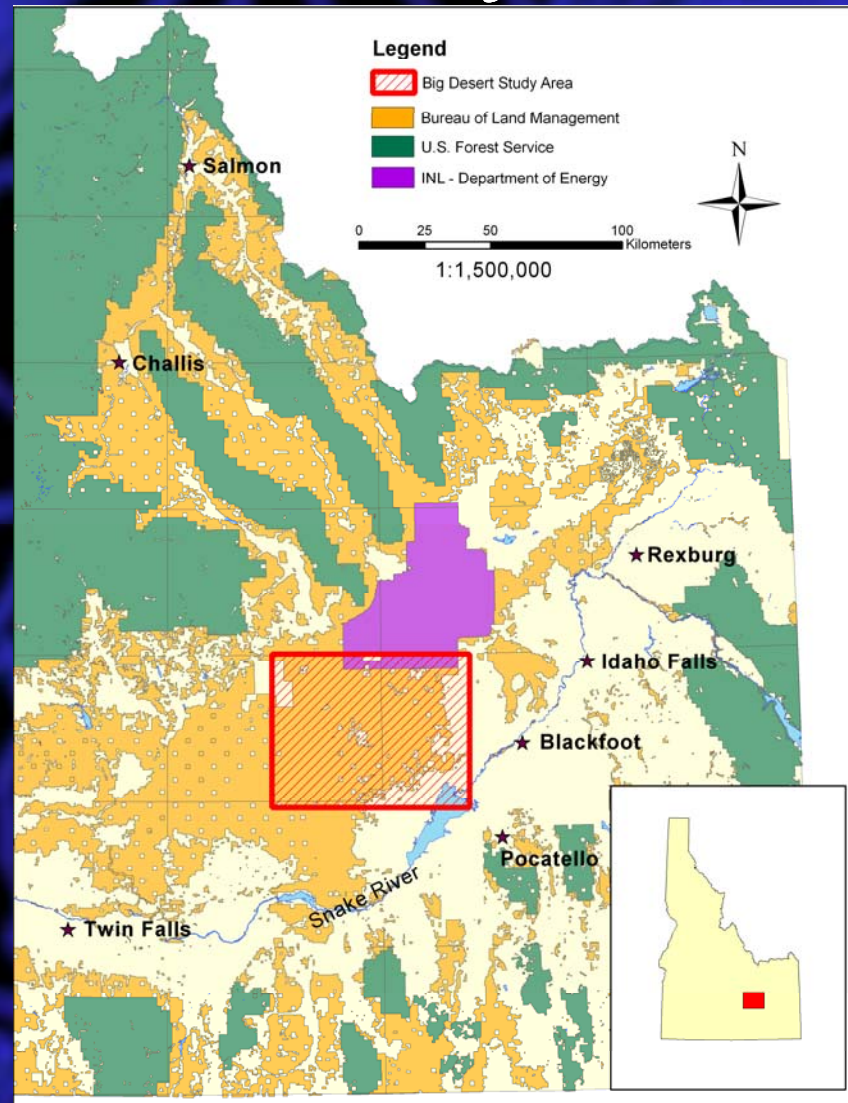
- NASA
- USDA ARS- USSES
- USDI BLM

What are Rangelands?

- Typically semi-arid (brittle)
- Grass and shrub dominated
- Not cultivated, irrigated, or fertilized
- Occupies 44% of Idaho



Our Study Area



A Brief History...

- Land cover change study
- Explore the primary agents of change
 - Weeds
 - Fire
 - Urbanization

Issues

- Invasive weeds
- Wildfires
- Desertification



Our Role to Managers

- Decision support tools
 - Predictive models
- Public outreach to decision makers
 - Increase understanding

Issue #1- Target Weed Species

- Cheatgrass
 - Interesting species
 - Brief life history
- Leafy Spurge



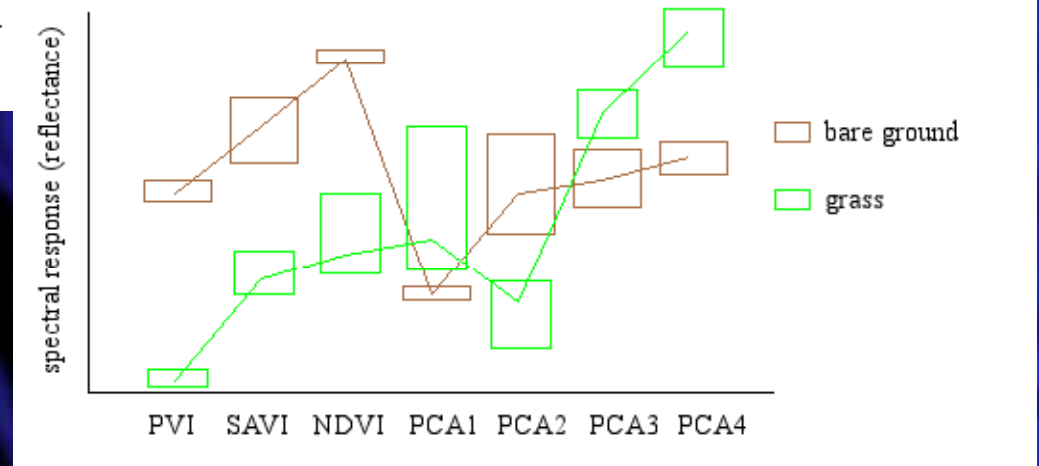
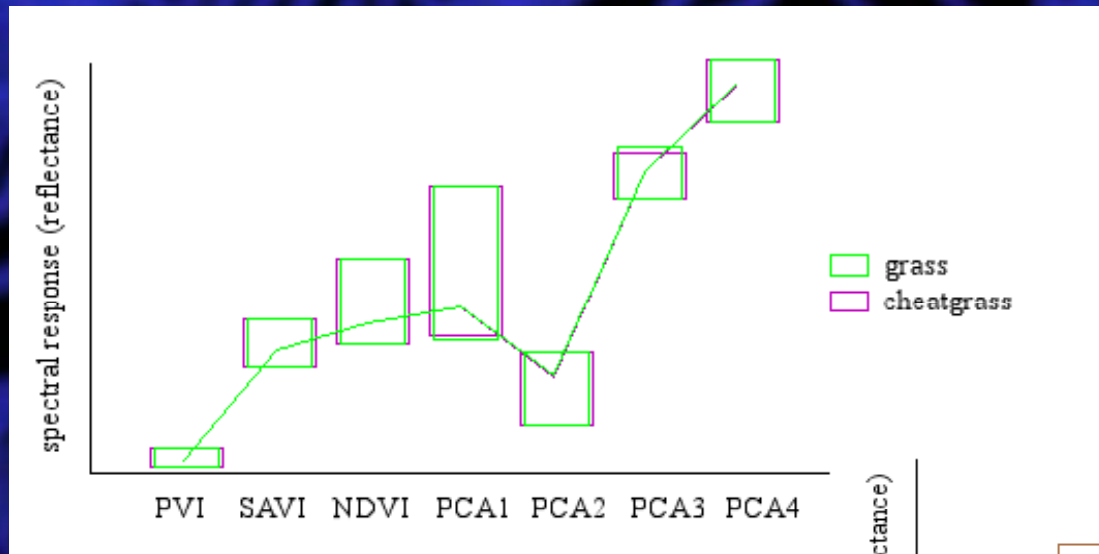
Current results

- Cheatgrass is difficult to detect reliably
 - Detection threshold
 - Patchy target
 - Similar to non-target features
- We have used Landsat, SPOT, and Quickbird imagery.

Patchy Target



Spectral Similarity



Issue #2, Wildfire

- Reliable fuel load modeling
- Current rangeland fire severity modeling

Issue #3, Desertification

- For land managers and land stewards...
 - Bio-diversity issue
 - Why is this weed here?
 - What are we to do about high fuel loads?
 - What can we do about the exposed soils?

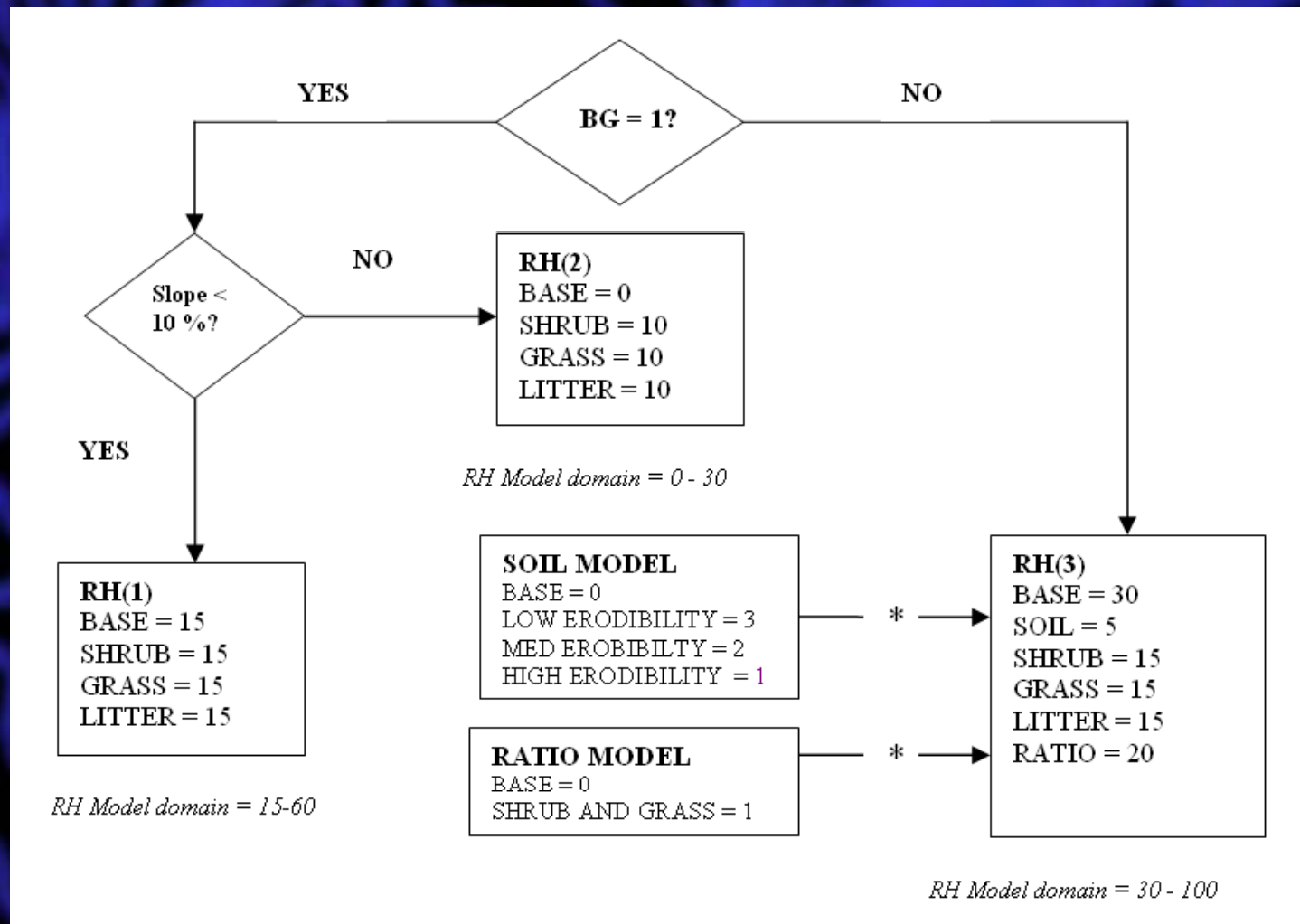
Holistic Integration

- Symptoms of degraded rangeland health
 - Loss of bio-diversity
 - Weeds
 - Bare ground
 - Ineffective water cycles with exacerbated drought effects
- We have studied the symptoms...now let's move to the cause.

Why are the Rangelands Degraded?

- It appears to be...
 - Years of over-rest
 - Following years of over-grazing of plants
- Why?
 - Grasses evolved with grazing
 - Grazed once in a season....not numerous times
 - Animal impact is important
 - Hoof action
 - Look at corral areas in the study area

Quantifying Rangeland Health: Modeling



Importance of Rangeland Health Modeling and Forecasting

- Big picture
- Addresses end-user core concerns
- Reliable models possible

Thank You

- For more information visit our Internet Map Server at:
 - <http://giscenter-ims.isu.edu/website/rangelands/viewer.htm>
 - Or visit our home page <http://giscenter.isu.edu>