

Using Remote Sensing to Make Rangeland Management Decisions

Background:

The rugged rangelands of Central Montana are home to many ranchers who manage thousands of acres of pasture land for hundreds of livestock (Figure 1). Remote sensing provides ranchers a way to monitor the growth of grazing vegetation throughout the season without riding over wide expanses of the rough Montana range. Bob Rumney, a Montana rancher and UMAC collaborator, has experienced success utilizing high resolution satellite images to manage weedy invasions into his rangeland. Bob's success has influenced a neighbor's decision to spray a 700 acre pasture to eliminate brush not suitable as graze.



Figure 1. Mountain Rangelands. This photo illustrates the difficult terrain that some western ranchers manage to produce livestock. Photo courtesy Natural Resource Conservation Service (NRCS) Grazing Lands Photo Gallery.

Use of Data:

Bob's neighbor was thinking of hiring a commercial company to spray his pasture from the air. However, the sprayer would not be able to target specific patches of weedy brush. Bob's neighbor was unsure if he should make such a large investment if his pasture was not heavily infested with weeds. Fortunately, Bob had acquired high resolution imagery from UMAC in 2001 and 2002 which included his neighbor's pasture. Bob then analyzed the imagery for bright red patches of dense vegetation to indicate the extent of weeds in the area (See Figure 2). At the time these images were taken all grass should appear light blue. Bob knew that these bright red patches were a healthy weedy brush, snowberry, a plant toxic to livestock. To increase production on these fields Bob's neighbor would have to spray herbicide to kill the weedy invaders. Bob estimated that his neighbor's pasture was approximately 50% weeds and the rest was productive grass. With this information Bob's neighbor could then weigh the options of spraying based on the direct economic costs and benefits.

Economic and Environmental Benefits:

The cost of spraying the pasture was \$15 per acre making the investment more than \$10,000 for all 700 acres. Since only 350 acres were weeds the actual cost of application went up to \$30 per acre. However, the potential return on this investment is substantial. By eliminating weeds in this field and returning productive grasses to the pasture, Bob's neighbor could receive a profit of \$200 per acre. If all 350 acres of brush were returned to grass, the profit would be \$70,000 from a \$10,000 investment. With the potential of a \$60,000 yield on this investment, Bob's neighbor decided to spray the pasture and capitalize on this opportunity.

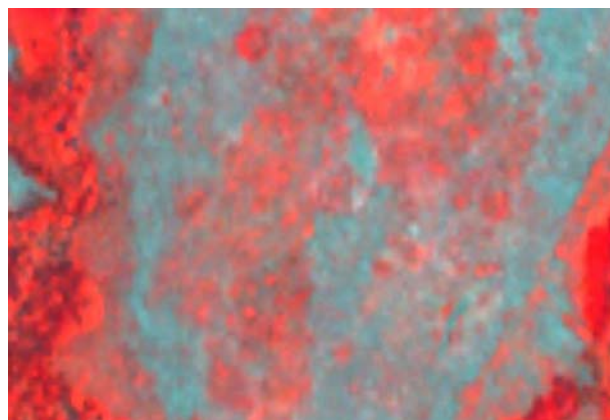


Figure 2. Remote Sensing Image. 2001 IKONOS high resolution image of Bob Rumney's pasture. (False color composite, band combination: Infrared (IR), Red(R), Green(G)).