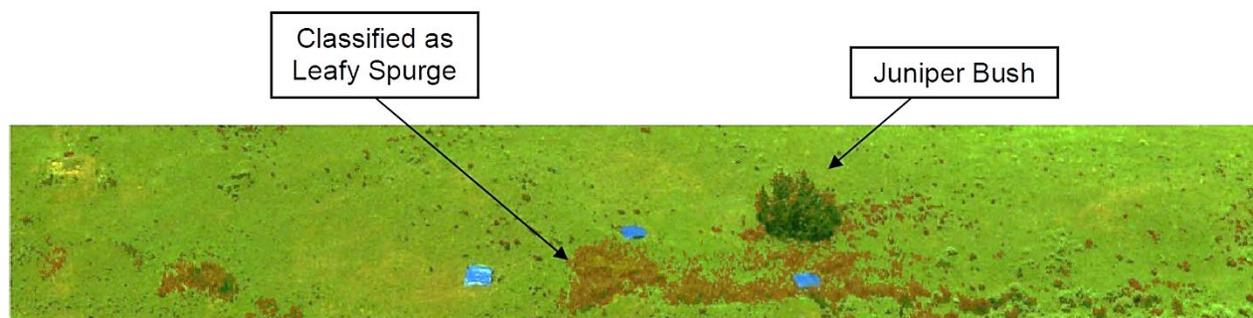


## Invasive Weed Mapping

Invasive weeds are estimated to have cost tens of millions of dollars in grazing losses, and areas impacted by invasive weeds are growing steadily. Accurate mapping is essential for effective weed management, and remote sensing has been widely studied for this purpose due to its ability to accurately survey large tracts of land. A group at Montana State University has been conducting remote sensing studies of invasive weeds using a compact, low-cost Pika II imaging spectrometer. Their results show that mapping accuracies with Resonon's Pika II instrument are comparable to those obtained with expensive, high-end spectral imaging instruments such as Probe 1 and AVIRIS [1]. Figure 1 shows an image collected with the Pika II. Red pixels indicate leafy spurge (an invasive weed). Other plants in this scene include grasses, a juniper bush, and sagebrush (mostly in the lower, right side of the image). Blue tarps (2 m by 2 m) provide scale.



**Figure 1.** False-color classification map, with red pixels classified as the invasive weed leafy spurge with an accuracy of 95%. This high classification accuracy was obtained on July 3, which was the date when leafy spurge was most accurately classified.

An important advantage of the Pika II system is that it is low-cost, easy to use, and highly portable. Consequently, monitoring efforts can easily adapt to weather conditions, measurements can be made during the optimal season for weed detection, and weed eradication efforts can be regularly checked – all of which is impractical with many currently available instruments. Figure 2 shows two graduate students taking measurements in the field using a battery operated Pika II system from a small tripod. Nine measurements were taken of the site shown in Figure 1 over an eleven week period. The measurement location was not accessible by vehicle.



**Figure 2.** Data recording at a remote site.

### References

1. S. Jay, R. Lawrence, K. Repasky, and C. Keith, "Monitoring leafy spurge using a low cost hyperspectral spectrometer", Proceedings of the American Society of Photogrammetry and Remote Sensing Annual Meeting, Baltimore, MD, 2009.