

## Application of Satellite-derived Vegetation Indices to Range Monitoring

Range monitoring addresses questions related to range condition and change through time that reflect both utility to livestock and broader environmental quality. Often, range resource measurements and observations are made at a limited set of locations along line transects or small plots, typically at annual or longer intervals. These data become the bases for estimates of condition at larger spatial scales (e.g., pastures or other management units) and for determinations of trends through time.

- Variability due to phenological change, even over a span of several days to a few weeks, can greatly exceed interannual variability for the same calendar date.
- In the interest of interpretability, remaining faithful to a calendar date may well be the most important facet of a monitoring strategy.
- In addition to the importance of timing, however, is understanding the range of variability that is inherent to the monitoring site. You could not know about interannual variability or the long-term average without regular (at least annual) monitoring.
- The satellite can provide frequent (as well as historical) pictures of greenness, which can serve as a proxy for relative range condition or productivity.
- There are other factors that come into play in interpreting satellite measures of greenness or productivity.
  - There maybe alternative relationships of greenness to forage (e.g., green v. standing dry biomass).
  - Other sources of variability that influence the NDVI (e.g., clouds and snow) can vary spatially as well as temporally.
- Additionally, if you want quantitative measures of forage (i.e. biomass), there is no getting around monitoring on the ground.
  - Satellite data can permit localized measurements to be extrapolated across space.
  - Those measurements must be made for a representative sample of locations and estimates will be accompanied by some degree of uncertainty.

