Performance and Trend of Remotely Sensed Forage Phenology and Productivity Metrics Across the Western United States

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Forage drives many important wildlife habitat, movement, and demographic processes, yet few studies assess the best remote sensing datasets for use in wildlife research and management. We compare phenology and productivity metrics from 10 leading remote sensing datasets against a network of PhenoCam near-surface cameras throughout the Western United States from 2002-2014 to guide users in dataset selection. Overall correlations and mean bias varied substantially by dataset, metric, and land cover. The best performing phenology metrics calculated a date rather than a duration (length of season, duration of spring greenup) with R2 ranging from 0.04â€"0.69. Datasets performed best in shrubland, grassland, and deciduous/broadleaf forest land cover types, and weakest in evergreen forests. Productivity metrics performed worse overall than phenology metrics, though some datasets showed strong results in deciduous/broadleaf forests. Using the two best performing datasets with a long historical record, we analyzed changes to growing seasons from 1982-2016 and compared results of the competing datasets. The direction of trend generally agreed but the strength of the trends differed. This study provides the first comprehensive comparison of remote sensing datasets across many important phenology and productivity metrics. We discuss considerations for users to make informed decisions about their data choices.