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Quantifying interannual variability in NDVI in the Lehman Creek watershed for use in estimating plant community phenological controls on streamflow under current and future climatic conditions

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Anthropogenic climate change is expected to result in earlier arrival of springtime environmental conditions and possibly extension of the growing season in the fall, as well as an earlier springtime shift to rain (vs. snow) as the dominant type of precipitation than presently occurs. These shifts may cause earlier plant growth, leaf area development, and higher canopy LAIs—as indicated by higher NDVIs—if growing conditions improve. Or if higher temperatures and lower precipitation occurs, the opposite may dominate the vegetation responses. For example, increases in transpiration earlier in the growing season, caused by early season warming, could remove percolating snowmelt water in the vadose zone and reduce surface and near surface flows toward Lehman Creek—thus reducing stream flow. So, in years with conditions like these, increased NDVIs may lead to years with lower stream flow. Thus, the objective of our study was to analyze the recent (1985-2011) year-to-year variability of NDVI of vegetation comprising elevational biomes (zones) along a transect within the Lehman Creek watershed extending from lowland salt desert shrublands to high elevation subalpine forests. These NDVI data eventually will be used to quantify the degree to which vegetation canopy phenology may modulate stream flow amounts and temporal patterns.