Forest Remote Sensing, Tree Identification, and Tree Physiology

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Tree species have distinct spectral reflectances that may be used to generally distinguish forests of different types. These reflectance spectra also probably play an important role in the growth and survival of the trees. Trees use PAR (photosynthetically active radiation) to grow. Other longer wavelength radiation may either present a heat-load burden, leading to excess evapotranspiration or temporary dormancy. In cold weather the non-PAR light may warm the plant to enable photosynthesis at a time that water is abundant as melting snowpack or foliar absorption.

We have modeled heat absorbance and the role of needle geometry in heat retention and heat shedding by several conifers in the Ophir Creek/Third Creek, North Lake Tahoe watersheds. Mountain hemlocks in particular have distinct spectral signatures that may be appropriate for a strategy of reducing solar heat loading while maximizing PAR absorbance. Using newer sensors that sample spectra where this tree's spectral signature differs from that other trees (yellow, red edge), we will delineate locations of these trees, and estimate whether they are in microenvironments that would be conducive to that strategy.