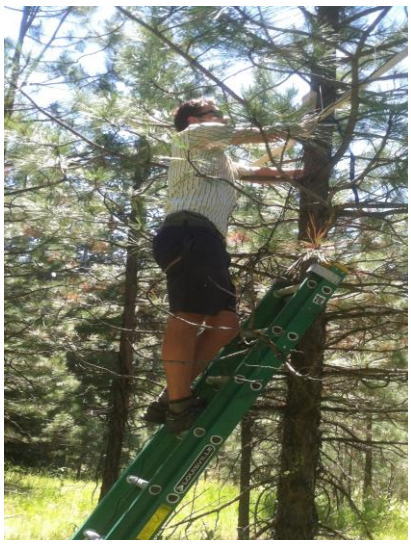
IdahoView Remote Sensing Activities 2015 - 2016

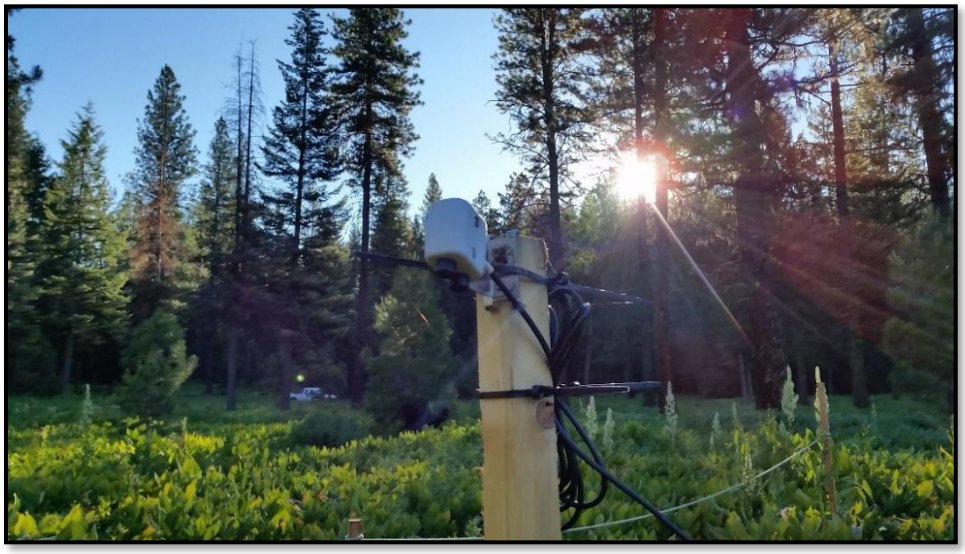
Exploring the suitability of a narrow spectral band at 531 nm for mapping plant function from future Landsat platforms

Idaho's economy strongly depends on its natural resources. This project is a high priority in Idaho because remotely sensed information about plant function could aid in improving natural resources decision making. One of most promising avenues of remotely sensing plant function is in the use of the reflectance signal near 531 nanometers (nm). At this location of the electromagnetic spectrum, it has been determined that plants are sensitive to rapid changes in the relative concentration of the three leaf pigments: violaxanthin, zeaxanthin, and antheraxanthin. This so-called "xanthophyll cycle" serves to protect plants from damage during periods where light levels exceed what can be used in photosynthesis, which often occurs in the presence of environmental stress, such as water stress. Hence, during times when leaves are under some environmental stress, the light that normally would go towards photosynthesis is instead dissipated by the leaf through the xanthophyll cycle, which leads to a decreasing reflectance at 531 nm. The aim of this project is to determine if the inclusion of a narrow spectral band at 531 nm on future Landsat missions would provide useful information about plant function.

To determine if the inclusion of a spectral band at 531 nm on future Landsat missions would provide useful information about plant function, ground-based Photochemical Reflectance Index (PRI) sensors were mounted over plant canopies. Preliminary analysis indicated that PRI is highly variable and highly temporally resolved PRI information (every 5-10 minutes) is necessary to obtain useful information about plant function. Data analysis is still in progress at this time, but we anticipate having final results in December 2016. Results will be publicly presented as part of two Masters defenses, and if possible, the results will be published in a peer-reviewed journal during the Spring of 2017.



Graduate student involved in IdahoView's High Impact Activity installing spectral reflectance sensors.



Spectral reflectance sensor that was installed near McCall, Idaho, as part of IdahoView's High Impact Activity.

The project explores ways of how future Landsat missions could further maximize the usability of Landsat data by including additional spectral bands. A graduate student has been directly involved in the research and communication of results to stakeholders. The project will also act as a seed grant for future proposal development. The findings from this study will be communicated to partners and stakeholders through publications and presentations.

IdahoView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state.

AmericaView Website:
www.AmericaView.org
Roberta Lenczowski, Executive Director:
roberta.lenczowski@sbcglobal.net
Chris McGinty, Program Manager:
chris.mcginty@americaview.org
Jarlath O'Neil-Dunne, Board Chair:
Jarlath.ONeil-Dunne@uvm.edu

Benefits to IdahoView

Small Unmanned Aircraft Systems (sUAS):
This high impact activity research planned for 2016-2017 promotes the development of novel tools and techniques for sUAS that are meaningful for Idaho's decision makers and beyond. Idaho State University has an active sUAS research program that supports the collection of data using a wide variety of sensors and UAS platforms. ISU has been granted a blanket Certificate of Authorization and special pilot exemption from the Federal Aviation Administration (FAA) for their operations. sUAS data will be collected at sites in Idaho and Montana during the 2016-2017 timeframe.

Engaging Students in STEM Activities:
It is vital to Idaho's economy to educate a qualified workforce in Science, Technology, Engineering, and Mathematics (STEM) professions. Industries that require STEM are expected to increase in Idaho and across the nation. In the upcoming year, IdahoView will be engaging students in the use of sUAS data collection using leading-edge hyperspectral sensors to address crop threats that impact Idaho's agricultural sector.

A Master's of Science in Geographic Information Sciences student at Idaho State University launches Trimble's UX5 Unmanned Aircraft System to study the reintegration of meander bends in the Portneuf River Channel near Pocatello, Idaho.

IdahoView Consortium Membership

IdahoView partners:

- Promote the development of novel tools and techniques that allow translating remotely sensed data into information that is meaningful to decision makers.
- Use remote sensing as a means to promote STEM interest and learning.
- Seek to expand involvement to incorporate all higher education institutions in Idaho and any other interested parties.
- Advance the availability and timely distribution of data by maintaining links to archives of publically available satellite imagery for Idaho.
- Encourage the use and scientific application of remotely sensed data from small Unmanned Aircraft Systems (sUAS).

IdahoView Principal Investigator:
Donna M Delparte, PhD
Idaho State University
208-282-4419
delparte@isu.edu

http://www.idahoview.org

Major funding for the AmericaView Consortium is provided by the U.S. Geological Survey through Grant Number G14AP00002.