IDAHOVIEW 2021 - 2022 ACTIVITIES

Our IdahoView PI attended the Pecora 2022 conference and contributed to AmericaView's efforts in outreach and communication of remote sensing research and education. At Pecora, IdahoView also provided an oral presentation on our 2021-2022 HIA using LiDAR analysis to develop an algorithm to detect geohazards along transportation corridors. Railroad corridors in northern Idaho are subject to landslides, debris flows, and rock fall. This project is a collaborative effort with partners from Idaho Geological

AmericaView at Pecora 2022. Doug Ramsey from UtahView (left) and Donna Delparte from IdahoView (right).

Survey, Geoscientists at Idaho State University and an industry partner at Burlington Northern Santa Fe railway company. Movement along these railroad corridors have affected rail operations and emphasized the need for a detailed understanding of geologic hazards and slope dynamics in this region to prevent river corridor contamination from materials transported in rail cars. These geologic hazards have the potential to severely impact railroad assets, profitability, and public safety, particularly when hazardous materials are transported such as oil tanker railcars. Knowing where the conditions and slope characteristics are ideal for initiating these mass movements and where deposition is likely is important for installing mitigation measures. Object-based image analysis (OBIA) is a method of feature extraction at an object level involving multiresolution segmentation and the classification at an object level instead of a pixel level.

Oil tanker rail cars along the Kootenai River in northern Idaho, August 2021
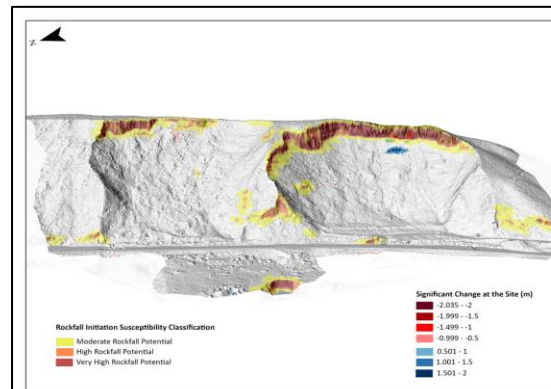
In this study we used topographic parameters such as canopy height, slope, aspect, plan curvature, profile curvature, and flow accumulation derived from UAS LiDAR to develop expert system rulesets to classify rockfall, landslides and deposition areas across three study sites using OBIA. We created three classification rulesets for each site: landslide initiation areas, rockfall initiation areas, and deposition areas. With these expert-derived rulesets railroad companies can map these susceptible slopes when planning mitigation and adaptation strategies.

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The accuracy of our rulesets was determined by examining areas of high slide or fall initiation susceptibility and how they corresponded with areas of measured change from previous LiDAR data collected in 2017. Overall, our models identified areas of rockfall initiation, landslide initiation, and deposition susceptibility that corresponded with an average of 69% of significant change between our study sites. Over time we expect to improve our rulesets through monitoring movements longterm. All rulesets were reviewed by a geohazards expert. Expert based susceptibility modeling relies on the knowledge of the geohazard expert to review criteria influencing rockfall, landslide and deposition potential especially in areas with limited records on mass movement frequency.

Rockfall and landslide susceptibility map

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. IdahoView actively engages graduate and undergraduate students in field data collection and the hands-on use of advanced sensors to address issues that impact Idaho's natural resources to aid decision making. Both undergraduate and graduate students are encouraged to participate in the research and communication of results to stakeholders through one-on-one interactions, posters and oral presentations.

MS GIS student Dana Drinkall presenting her LiDAR research at a 3 Minute thesis event at ISU (Fall 2021)

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 advanced sensors

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