

Session Abstracts

Improving Idaho Water Storage Infrastructure with Site-selection Modeling for High-Elevation Subsurface Water Storage Structures

Presented by Mel Campbell, Bannock County GIS

Description: Idaho is facing ongoing drought and water curtailment issues, putting many water users at risk, including those that divert water for agriculture, the backbone of Idaho's economy. Subsurface water storage using partial cut-off walls in high-elevation stream valley sediments offers a viable solution. These structures store groundwater during excess runoff periods while maintaining downstream surface and subsurface flow, and the stored water can be released during dry periods. We developed a spatial, multi-criteria decision framework to identify potential stream reaches in Idaho suitable for subsurface water storage. We evaluated suitability of various factors across climate, hydrology, geologic setting, topography, and socio-economic categories, and weighted these criteria using expert judgement. This resulted in a suitability index map of Idaho streams. From this we identified locations along several candidate streams where subsurface detention could benefit local water users.

Keywords: *water storage, Idaho, spatial modeling, multi-criteria decision making*

Geospatial Innovation for Aging Canals: A Path to Water Security

Presented by Avantika Ramekar, Prairie Engineers

Description: Water scarcity is limiting agricultural productivity in Puerto Rico's Isabela Irrigation District following hurricane damage to Guajataca Dam in 2017. With rehabilitation not expected until 2032, improving the performance of the early 20th century canal system is critical to sustaining water delivery. This project applied high-resolution topo-bathymetric LiDAR and photogrammetry to support canal rehabilitation planning. The data enabled detailed mapping and 3-inch orthophotography, supporting extraction of infrastructure features and development of a surface model covering over 44 miles of canals and laterals.

These datasets supported condition assessment, identification of capacity constraints, and preparation of planning documents for targeted improvements. The project demonstrates how geospatial technologies can accelerate infrastructure evaluation and support cost-effective rehabilitation.

Keywords: *LiDAR Mapping; Irrigation Infrastructure; Water Resource Management; Photogrammetry; Canal Rehabilitation*

Assessing the Influence of Vegetation Cover Change on Flood Severity: A GIS and Remote Sensing Case Study of Chikwawa District, Malawi

Presented by Margaret Chilinda, Arizona State University

Description: Flooding is one of the most devastating natural disasters affecting sub-Saharan Africa, and vegetation loss is widely recognized as a driver of increased flood severity. This presentation examines how changes in vegetation cover between 2019 and 2022 influenced flooding in the lower Shire flood-prone area of Chikwawa District, Malawi; one of the country's most disaster-prone regions. Using satellite imagery, NDVI analysis, and remote sensing techniques, vegetation cover changes were mapped and quantified over the study period. Flood impact data was compared against vegetation change findings, and a statistical test was applied to assess statistical significance. The results offer practical, evidence-based insights into how land cover degradation amplifies flood risk and how GIS tools can support resilience planning in vulnerable communities. Attendees will gain a clear understanding of how spatial analysis and remote sensing can be applied to real-world flood management challenges.

Keywords: *Vegetation cover, NDVI, flood severity, remote sensing, satellite imagery, land cover change, Malawi, climate resilience, GIS analysis, flood-prone areas*

From Assets to Insight: Rethinking Stormwater for a Resilient Future

Presented by Johnny Harley, TREKK Design Group

Description: Most stormwater systems are full of data, but still short on answers. Crews are collecting inspections, condition scores, and notes every day, yet when it comes time to prioritize maintenance, many organizations are left asking: what actually matters? This session challenges the idea that more data leads to better decisions and instead focuses on how to define, collect, and use the right data to understand asset health. Attendees will walk through a practical, GIS-driven approach to simplifying field collection, improving consistency across teams, and turning raw observations into clear, defensible actions. Built on real-world lessons (including what doesn't work), this presentation offers a fresh look at how small changes in workflow design can lead to smarter, more resilient stormwater systems.

Keywords: *Data Collection, Stormwater, Data Design*