Lidar + GIS: Revolutionizing Landslide Mapping and Field Evaluation

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Part I: Lidar-Based Inventories and “Desktop” GIS
Washington Geological Survey’s High-Res lidar

Hillshade and Slope Shade
Landslides on 10m DEM Shaded Relief

USGS 10m Shaded Relief
Landslides on 10m DEM Shaded Relief

USGS 10m Shaded Relief
Landslides on 3ft Lidar Derivatives

Part I: Lidar – based inventories

Slope Shade
Landslides on 3ft Lidar Derivatives

Slope Shade
SLIP (Streamlined Landslide Inventory Protocol)

- Rapid mapping over large areas
- Generates a comprehensive database, which can stand alone or be used to focus on areas for detailed mapping
Inventories from lidar vs. Aerial Photo Interpretation

Part I: Lidar – based inventories

Literally can’t see the landslides for the trees.
Inventories from lidar vs. Aerial Photo Interpretation

Part I: Lidar – based inventories

Literally can’t see the landslides for the trees.
Detailed Landslide Inventory – Partnership with Pierce County

- Landslide Hazards Pilot Project: Pierce County
- Comprehensive inventory for the whole county
- 702 landslides with detailed attributes (over 25 attributes per slide)
- 547 SLIP (previous slide) landslides
New lidar inventory vs. 10m DEM/Orthophoto inventory

Old inventory (pink polygons) with new lidar-based inventory (blue outline) superimposed.

Old inventory – mapped from 10m DEMs and aerial photography

New inventory – 3ft DEM
Landslides on 10m DEM Shaded Relief vs Lidar

USGS 10m Shaded Relief

Part I: Lidar – based inventories
Landslides on 10m DEM Shaded Relief vs Lidar

Part I: Lidar – based inventories

3ft Grid lidar – derived vertical hillshade
Mapping Landslide Features with Lidar

Part I: Lidar – based inventories
Detailed Landslide Attributes and Lidar
Part II: GIS in the Field
Coarse-scale geologic mapping (1:100,000) can be refined through the use of lidar.
ArcCollector: No more soggy notes!

Replacing This ➔

← With this
Other Mobile GIS applications

- Trimble – hillshades loaded into device, provide good position accuracy for locating ourselves in the forest and near landforms.
- Laptop with ArcGIS loaded, connected to a GPS