2018 SEED Project Data Collection & Processing Report
Quantifying the Geomorphic Effectiveness of Paleo-Outburst Floods in the Truckee River Canyon

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Data Collection Summary:

Collection Dates, # Flights:	September 22, 2018 (DOY: 265)
Aircraft, Equipment:	Piper Navajo PA-31-350 (Tail No. N640WA), LIDAR: Optech Titan (14 SEN/CON 340)
Flight Plan Parameters:	Flying Height: 600/700 m AGL above the highest peak, Swath Width: 560/720 m, Overlap: 50%, Line Spacing: 260/395 m
Equipment Parameters:	PRF: 100/75 kHz, Scan Frequency: 36/32 Hz, Scan Angle: ±30/ 25°, Cutoff: 2°
Planned Laser Pulse Density:	Mean 10 pulse/m²
Requested/Collected Area:	40 / 90km² (collected area computed from average DEM/DSM filled nodes)

GNSS Reference Station Summary:

1.	NCALM 5212K	N 39° 19’ 9.21925”	W 120° 8’ 50.53805”	1776.560 (m ellipsoid)
2.	PBO P146	N 39° 20’ 14.85510”	W 120° 32’ 14.22607”	2347.833 (m ellipsoid)
3.	PBO P150	N 39° 17’ 32.55508”	W 120° 2’ 1.81964”	2619.637 (m ellipsoid)

Data Products Summary:

Horizontal / Vertical Datum:	NAD83(2011) (EPOCH:2010.0000)/ NAVD88 (GEOID 12B)
Projection / Units:	UTM Zone 10N / meters
Point Cloud Tiles:	162 total 1000 m × 1000 m tiles in LAS format (Version 1.4), classified into **ground** (class 2), **unclassified** (class 1), **Bathymetric** (class 9), **water points** (class 38), **water points IR** (class 39) and noisy low points (class 7)
Raster Sections	All project area in a single raster.
Bare-Earth Elevation Model:	ESRI FLT format @ 1 m grid spacing from classified ground and bathymetric returns
Bare-Earth Hillshade:	ESRI-created raster @ 1 m grid spacing using parameters (315° Azimuth, 45° Elev)
First-Surface Elevation Model:	ESRI FLT format @ 1 m resolution based only on first returns
First-Surface Hillshade:	ESRI-created raster @ 1 m grid spacing using parameters (315° Azimuth, 45° Elev)
Bare-Earth Terrain Model:	ESRI FLT format @ 1 m grid spacing from classified ground returns from IR (Infrared – 1500 and 1064 nm) channels only
Bare-Earth Hillshade:	ESRI-created raster @ 1 m grid spacing using parameters (315° Azimuth, 45° Elev)
Additional Raster	first return intensity rasters (C1 1550 nm, C2 1064 nm, C3 532 nm, false color 8-bit RGB raster where R = C1, G = C2, B = C3)
High Resolution RGB Imagery	Ortho-Rectified RGB Imagery collected with DIMAC High resolution camera

A detailed summary of the equipment and processing techniques used by NCALM is included in the Data Collection & Processing Summary.

Special notes:

1. Direct validation of the point cloud and raster datasets within the project area was not conducted due to lack of access to project area. However, indirect validation was conducted through the analysis of the height of lidar returns over Mammoth Lakes, CA which was flown on the same day, with the same instrument installation and equipment parameters. This was used to remove vertical bias of 13.5 cm and assess the point cloud vertical precision at 2.5 cm.

2. ‘Bathymetric class’ (class 9) consists of lowest points that penetrated water and were corrected for bathymetry. These returns can either be from river bottom floor or the water column depending on the clarity of water and reflectivity of water bottom surface. These returns were corrected for the refraction effects.
3. ‘Water IR class’ (class 39) consists of returns from the Infrared Channels i.e. 1064nm and 1500nm from the river water surface. The Digital terrain model using the infrared channels would give the river water surface elevations

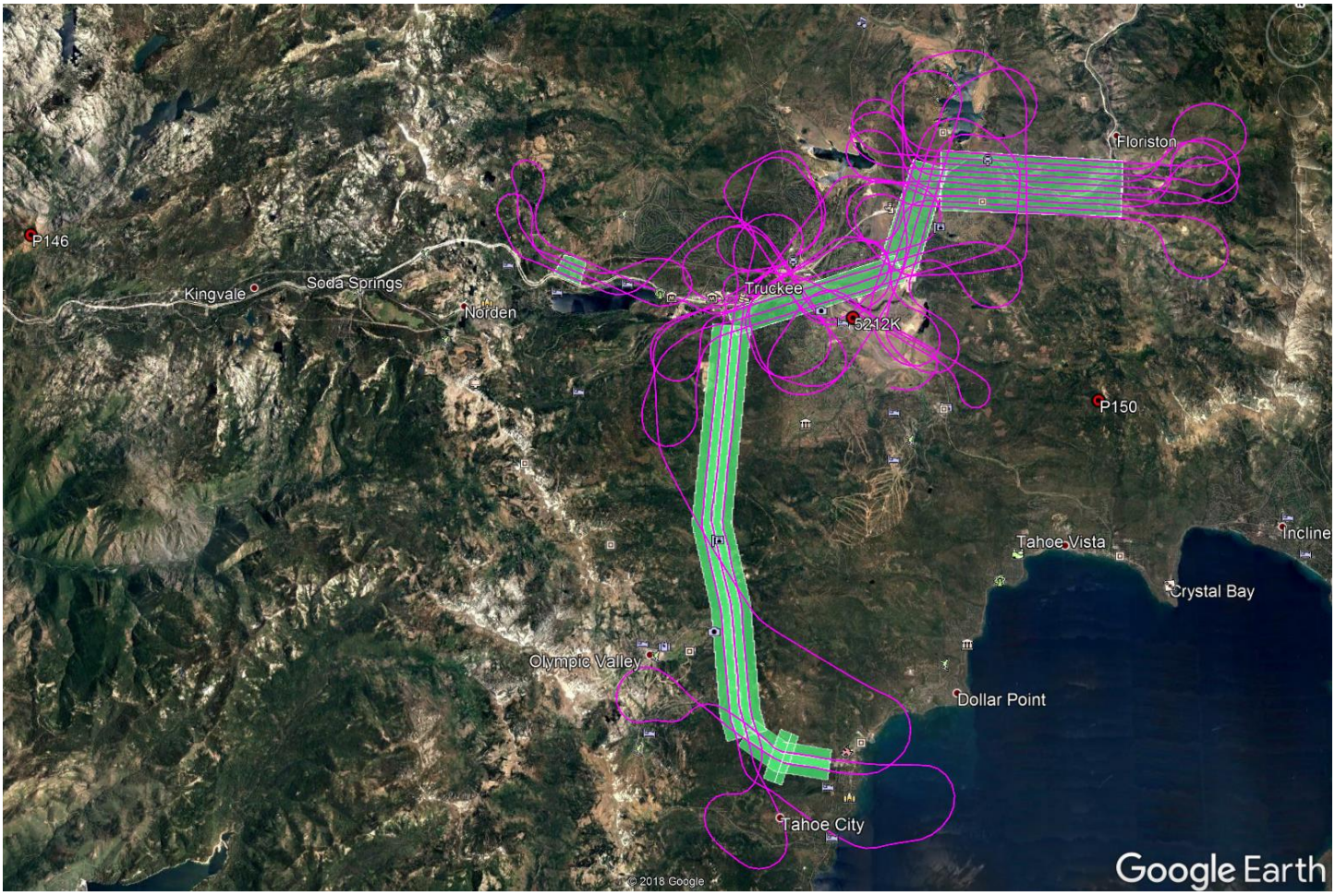

Figure 1. Area of Interest (Green polygons), GPS control points (Red targets) and the flight trajectory (Pink polylines)

File Naming Conventions:

Due to the limited number of characters (13) that can be used for ArcGIS data products, the following format is followed: NNNNN_TDR_##U. The explanation of the charcters used is as given below

- Characters 1–5 “NNNNN”: Correspond to the (up to) five-character identifier for the project or project area. For this project the identifier used was KTRK1 and KTRK2 for the two polygons.
- Character 7 “T”: The seventh character “T” represents the type of raster: “G” for a grid and “H” for a hillshade
- Character 8 “D”: The eighth character “D” represents what kind of data that was used to create the raster: “E” for elevation and “I” for intensity
- Character 9 “R”: The ninth character “R” represents the type of returns that were used for creating the raster: “F” for first return, “G” for ground classified returns from all channels, “B” for ground classified and bathymetric returns, “T” for ground classified returns from IR channels only.
- Characters 11–12 “##”: The eleventh and twelfth characters “##” represent the raster resolution: “01” for 1 meter
- Character 13 “U”: The last character “U” is an indicator for the unit of measurement of the pixel size: “m” for meter