

Remote sensing data fusion and analytics for natural resource applications:

Mischa Hey: Analytics Practice Lead

Acquire

Analyze

Answer

Agenda

*Enhancing science and
understanding to manage our
world responsibly*

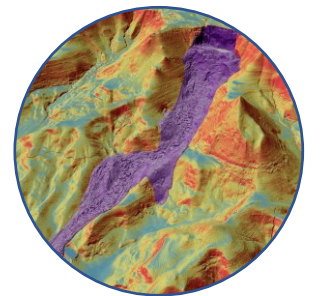
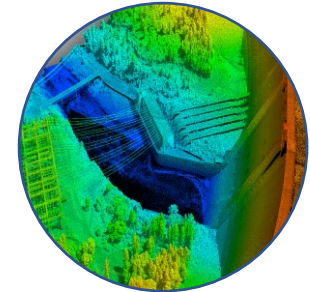
Introduction

Remote Sensing Technologies

Data Integration

Vegetation and River Analytics

Questions?

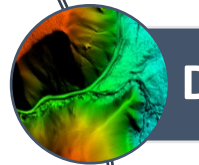


What We Do

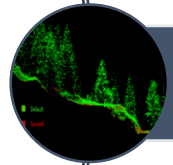
Full spectrum of geospatial support services on land and in the marine/coastal environment



Remote Sensing, Data Collection & Processing



Data Analysis, Analytics & Mapping



Data Management, Migration & Integration



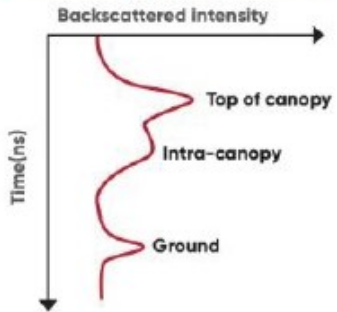
Enterprise GIS Solutions & App Development



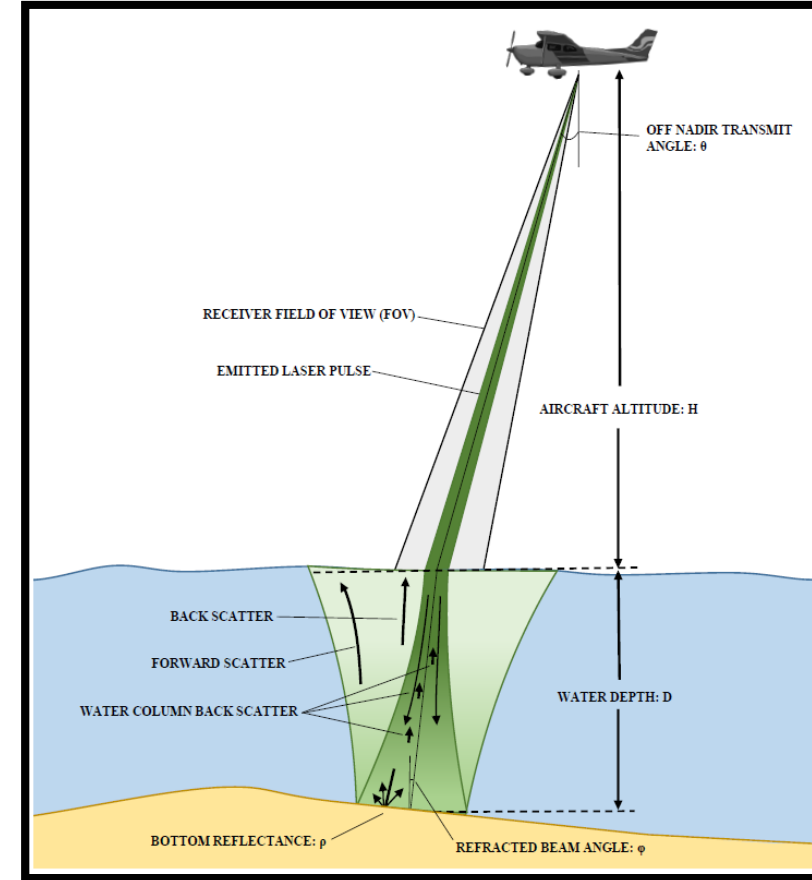
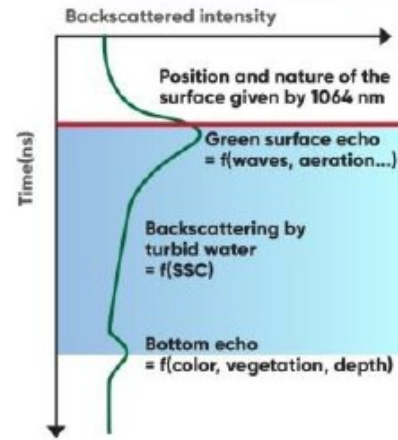
Onsite Technical Support Services

Green & NIR Lidar

Topographic Waveform 1064 nm

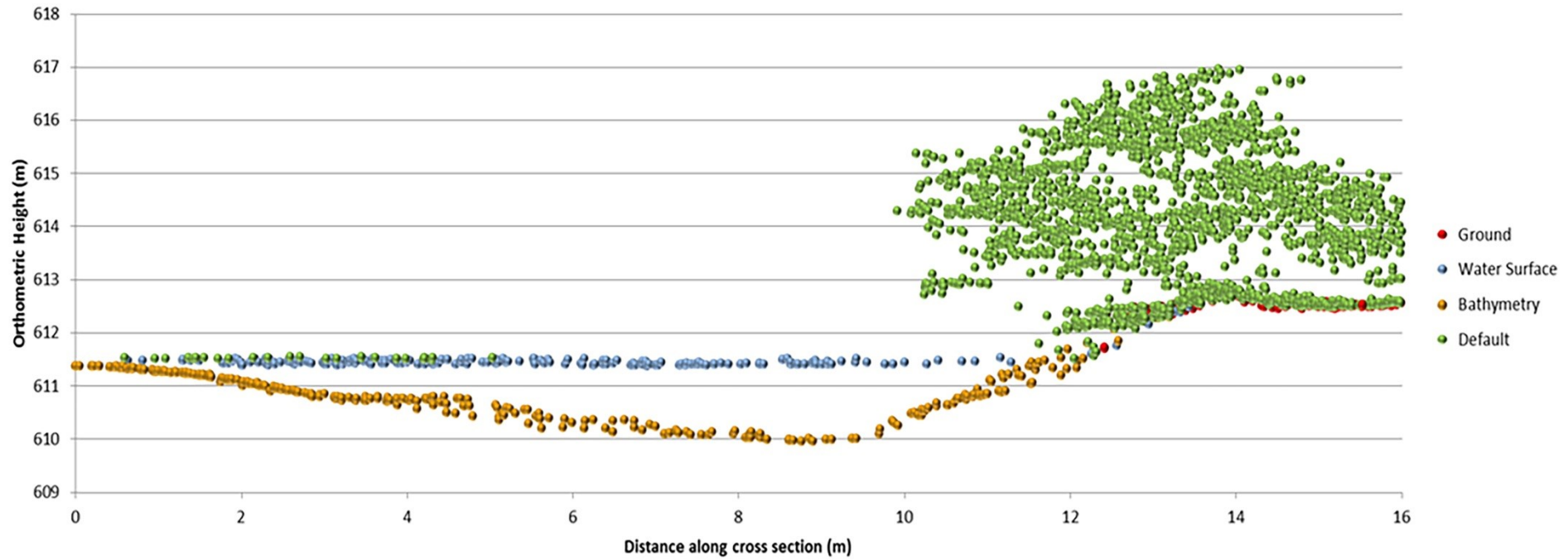
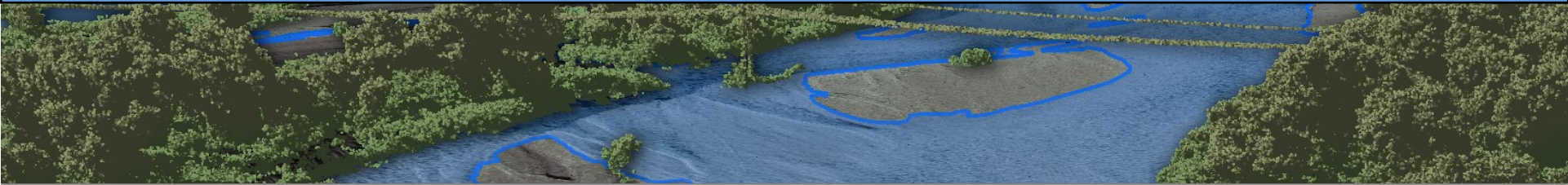


Bathymetric Waveform 532 nm



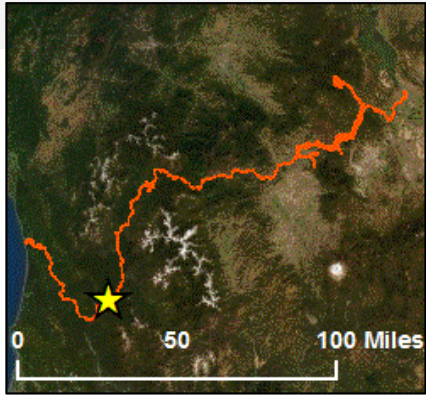
Graphic courtesy of Chris Parrish

Topobathy DEM with Above Ground Lidar Returns




Data fusion with other tech

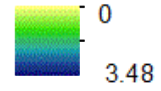
Lidar/Sonar Integration



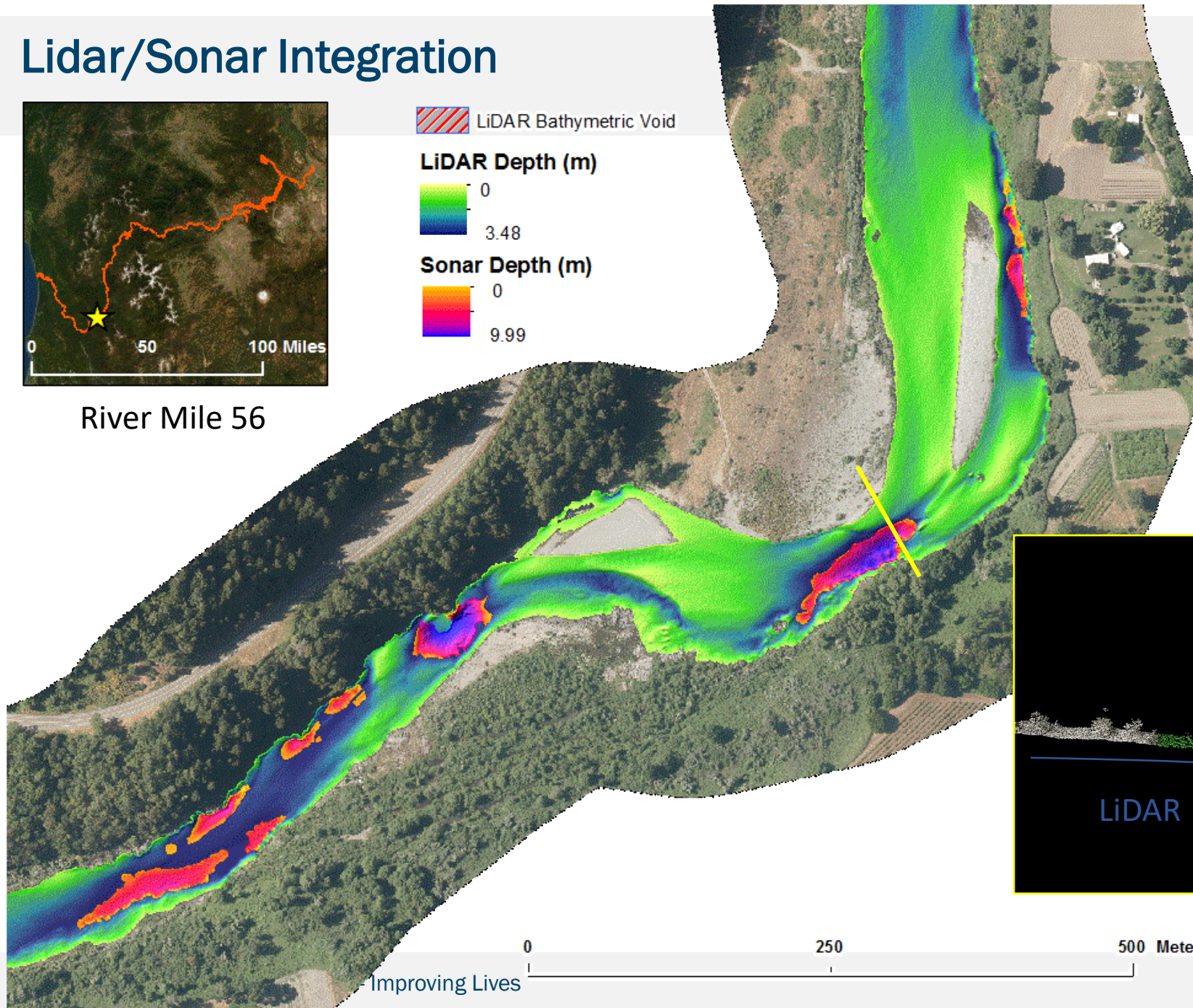
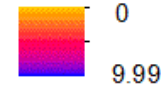
River Mile 56

 LiDAR Bathymetric Void

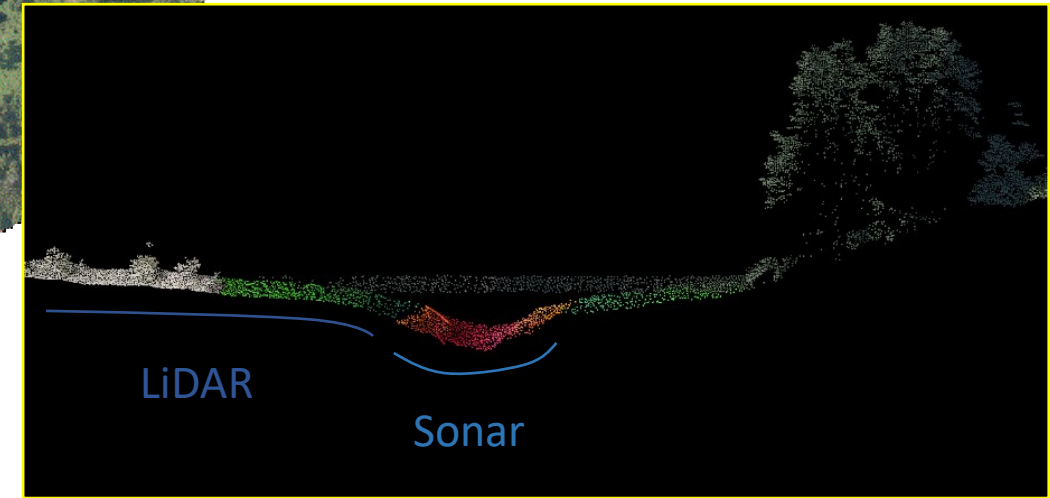
LiDAR Depth (m)



Sonar Depth (m)



Klamath River, CA



Digital Imagery Integration



Lidar



Imagery



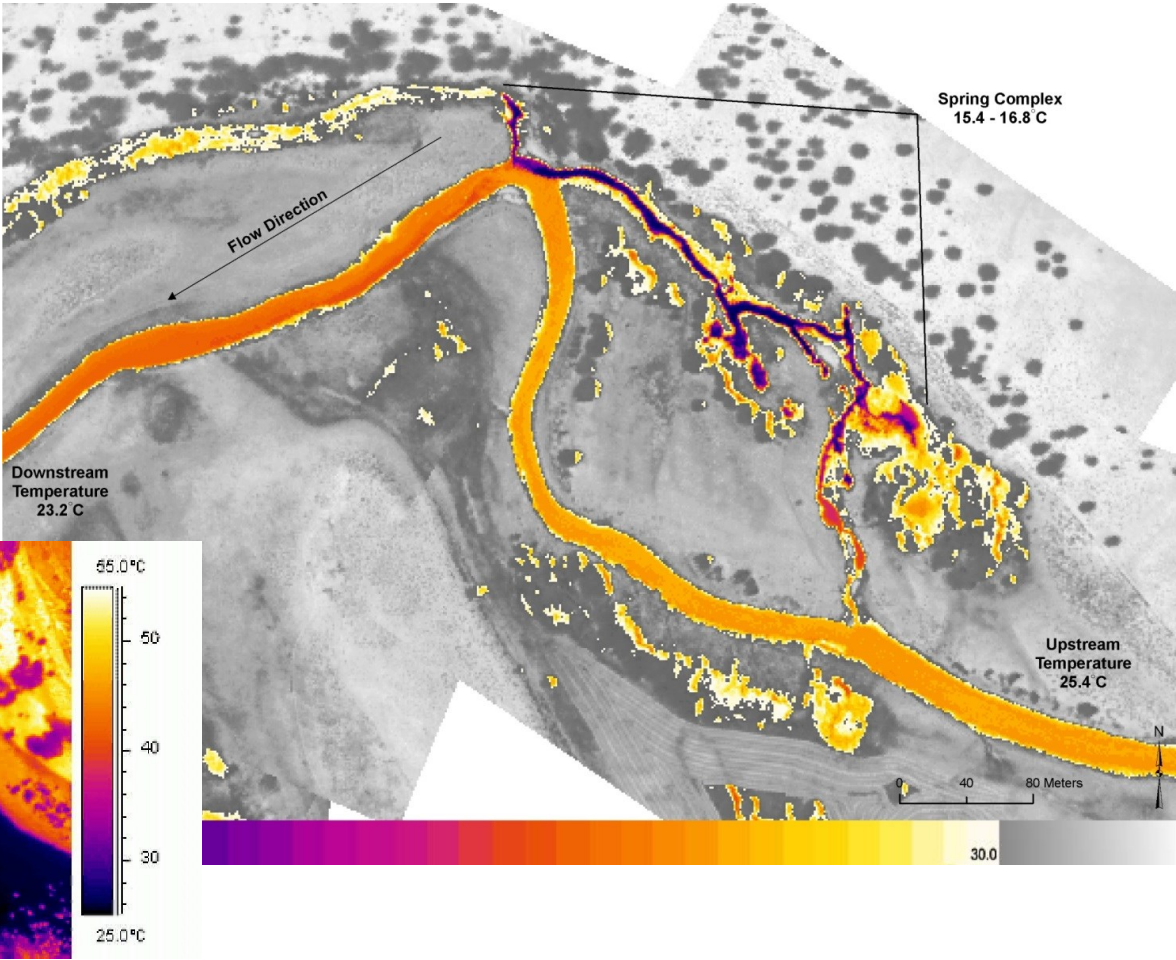
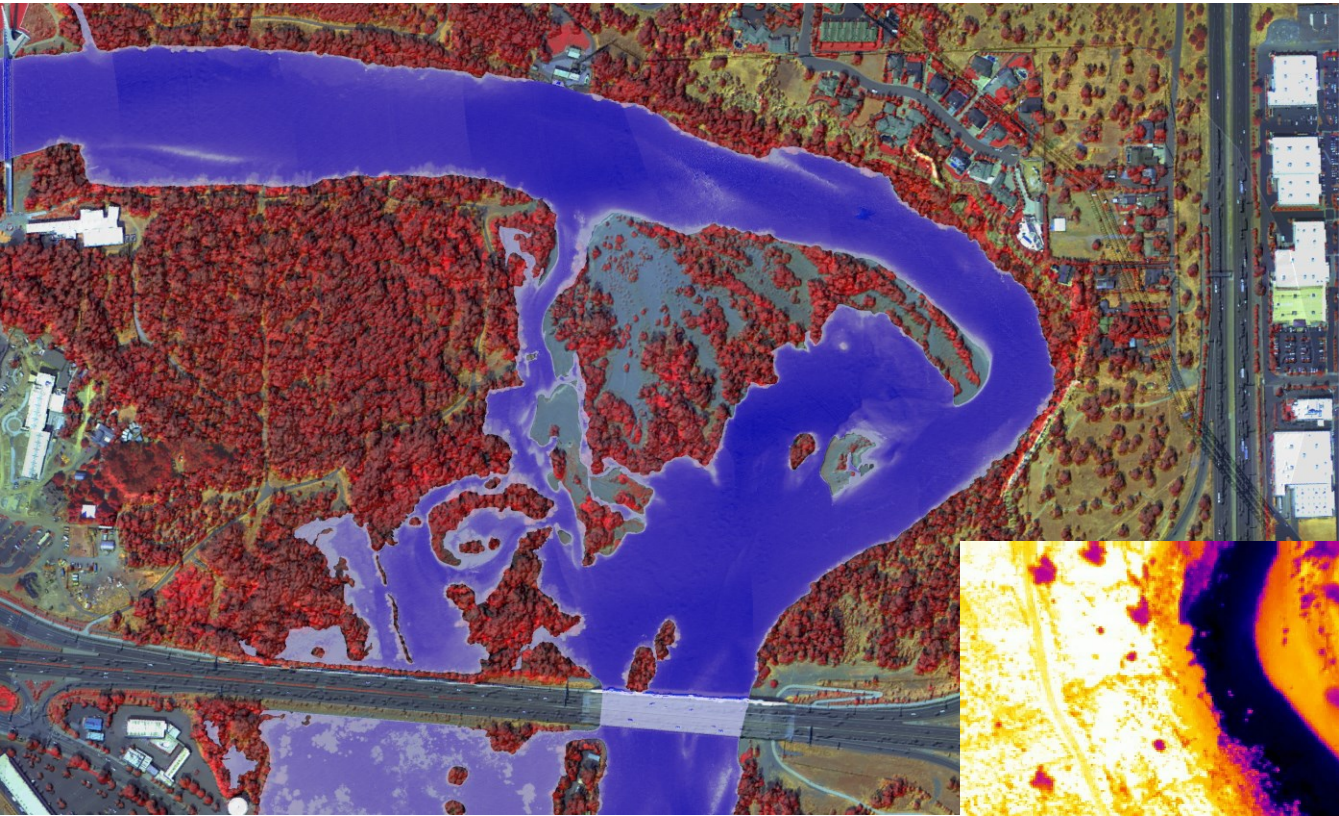
Ray Tracing Product



Standard Ortho Product



Fancy Imagery: Hyperspectral, Thermal



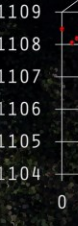
SPECIES GROUP	FIR
HEIGHT	36.63 M
CROWN DIAMETER	11.32 M
DBH	0.85 M
CONDITION	HEALTHY

DEPTH	0.32 M
TEMPERATURE	14.7°C
GEOMORPHIC CLASS	RIFLE
SOLAR EXPOSURE	HIGH

DEGREES
CELSIUS



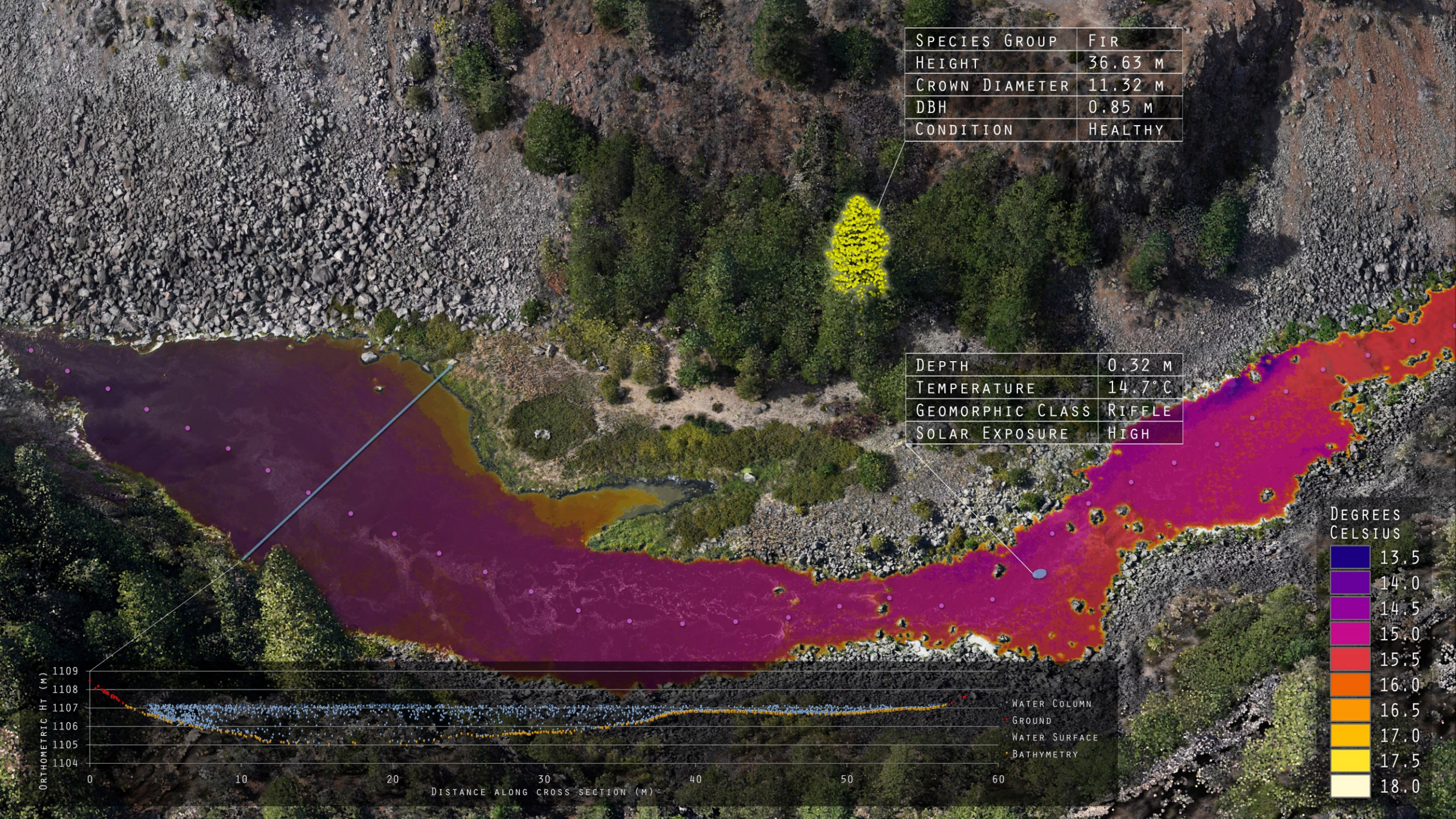
ORTHO METRIC HT (M)



DISTANCE ALONG CROSS SECTION (M)

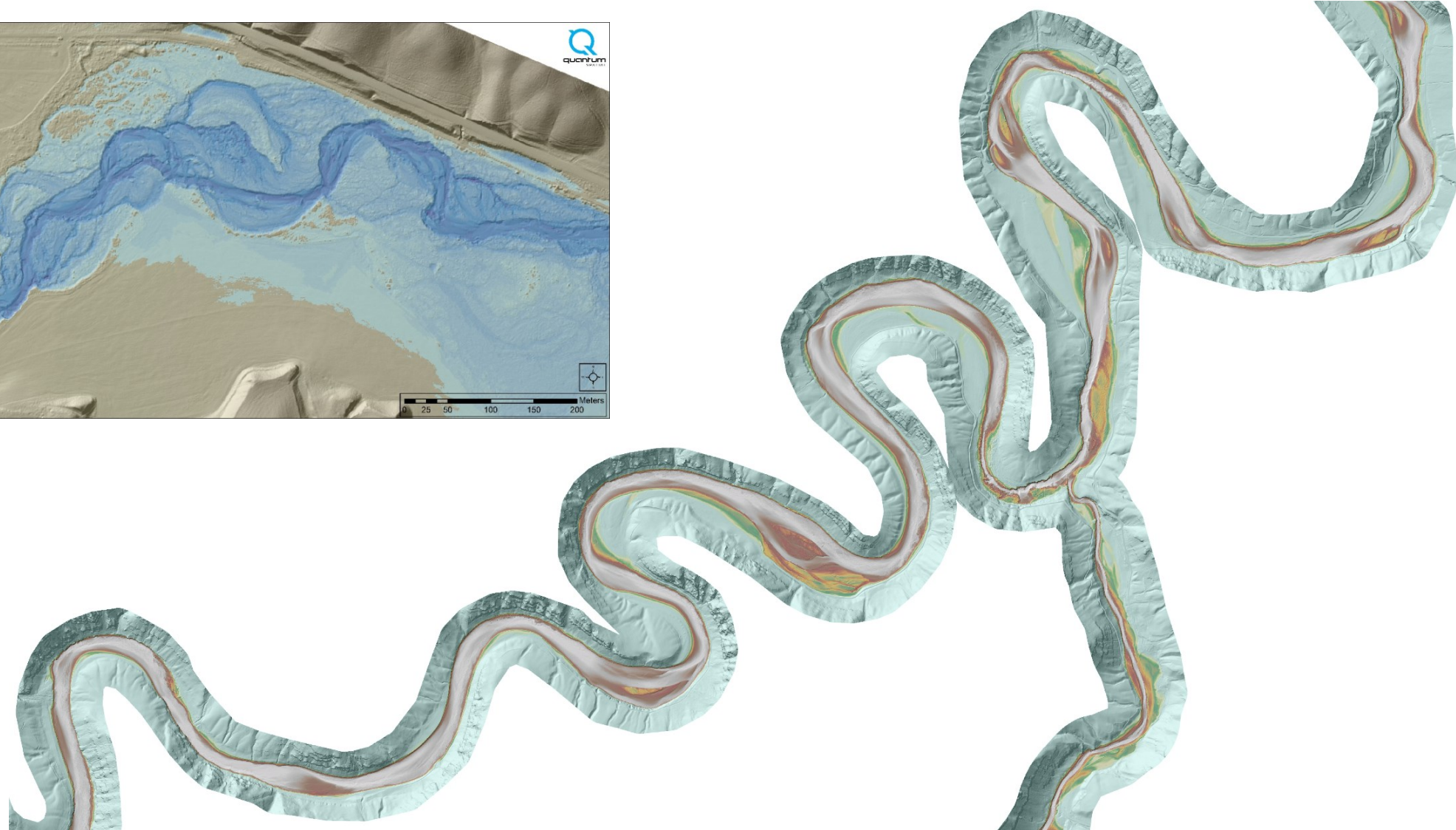
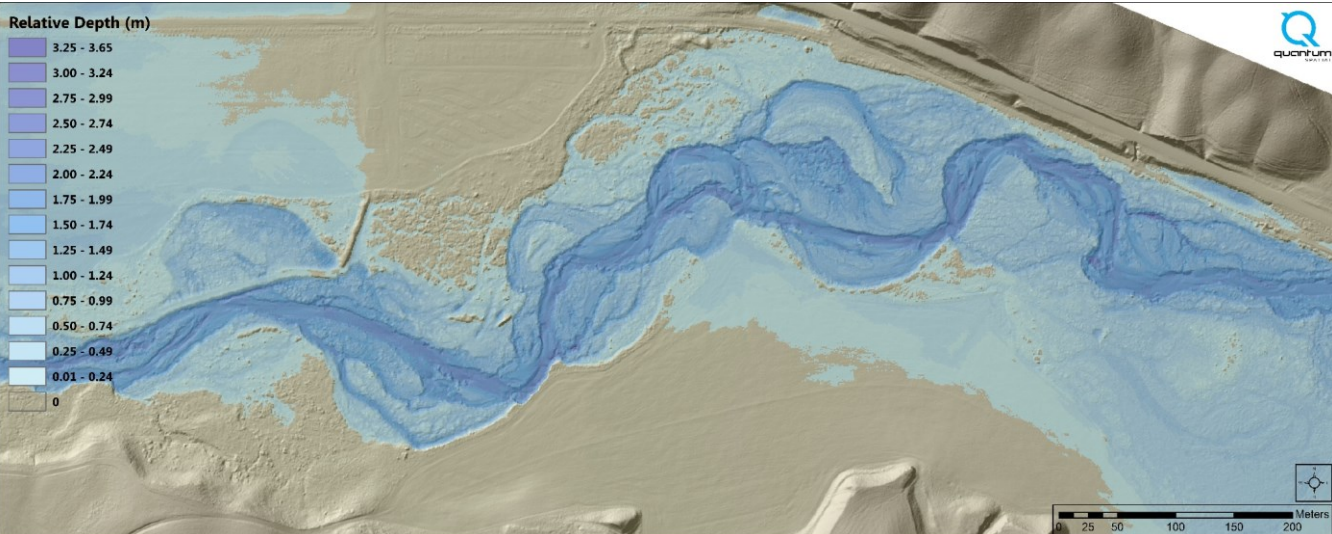


- WATER COLUMN
- GROUND
- WATER SURFACE
- BATHYMETRY



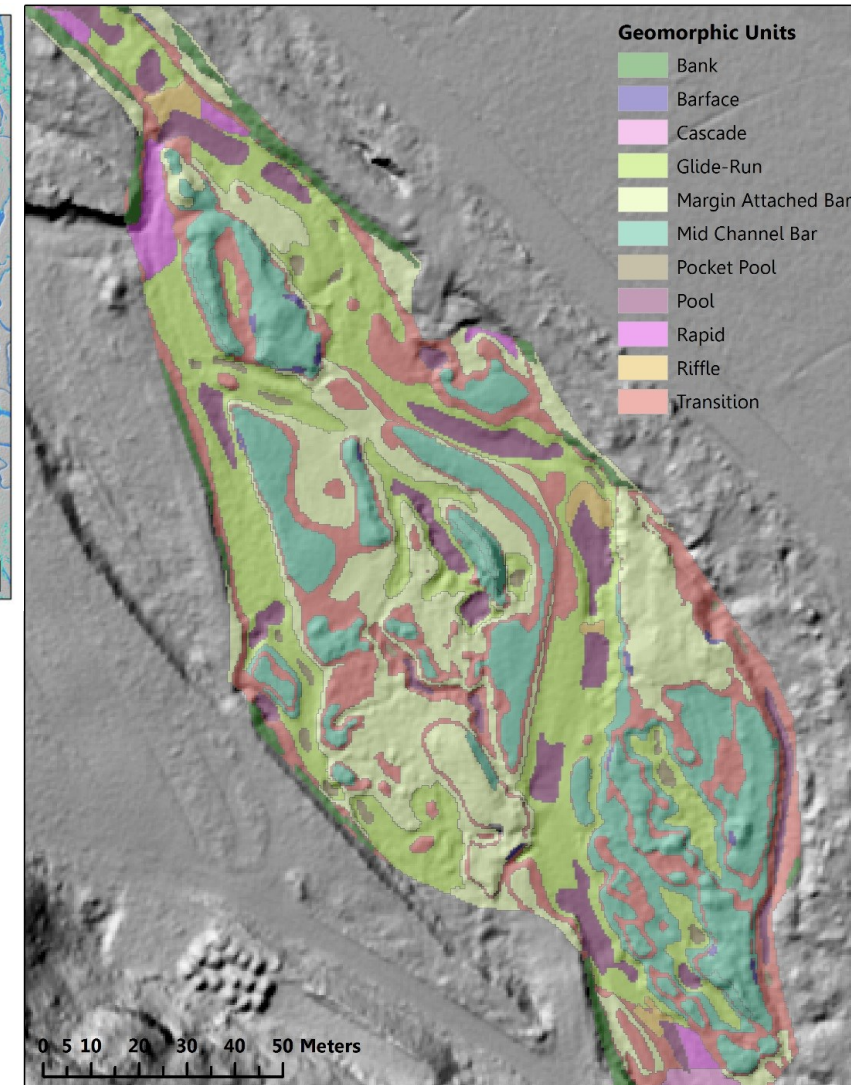
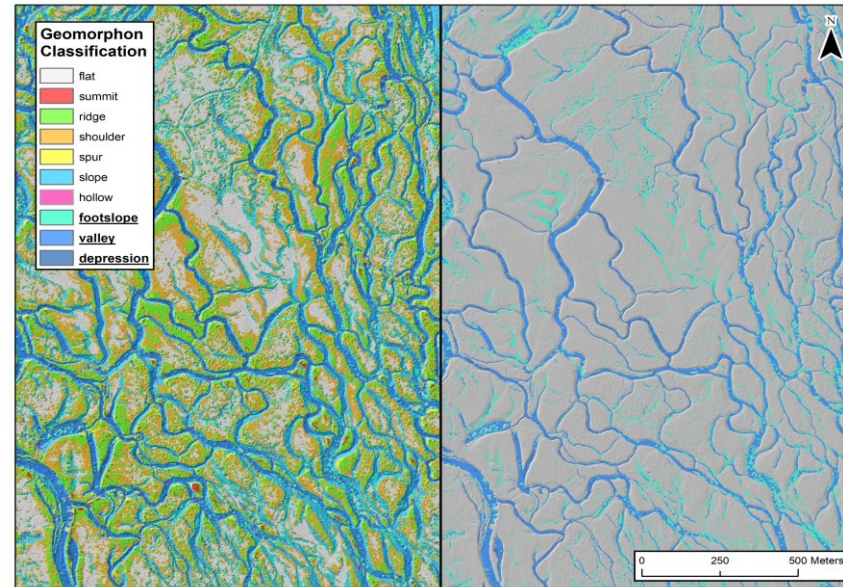
Analysis and applications

Floodplain Connectivity (REMs)

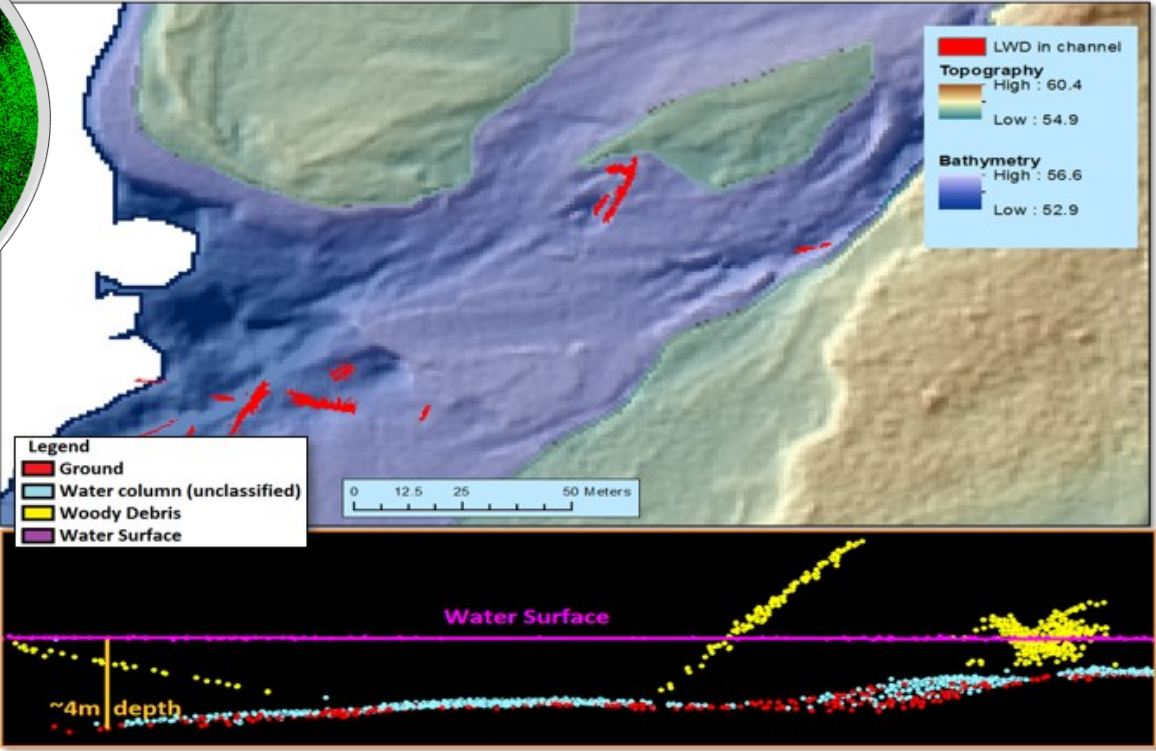
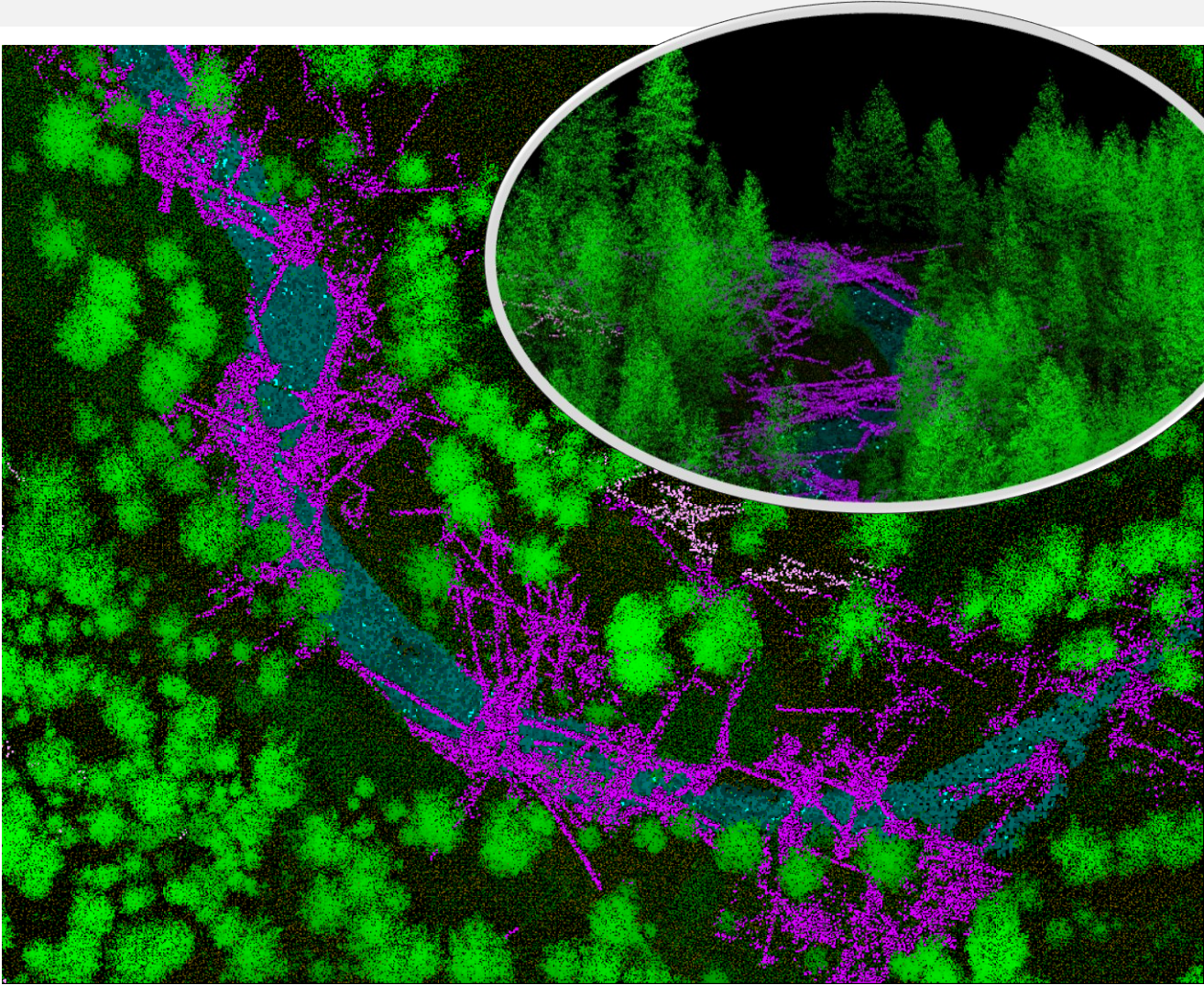


Geomorphic Unit Classification

- Micro terrain characteristics
- Geomorphic Units
 - pools, riffles, runs, transition, etc.
- Wetlands, groundwater infiltration
- Suitability and productivity



Large Woody Debris (LWD)

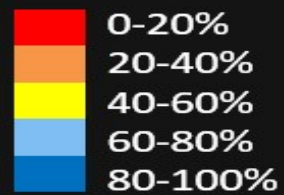


Solar Analytics – Stream Shade

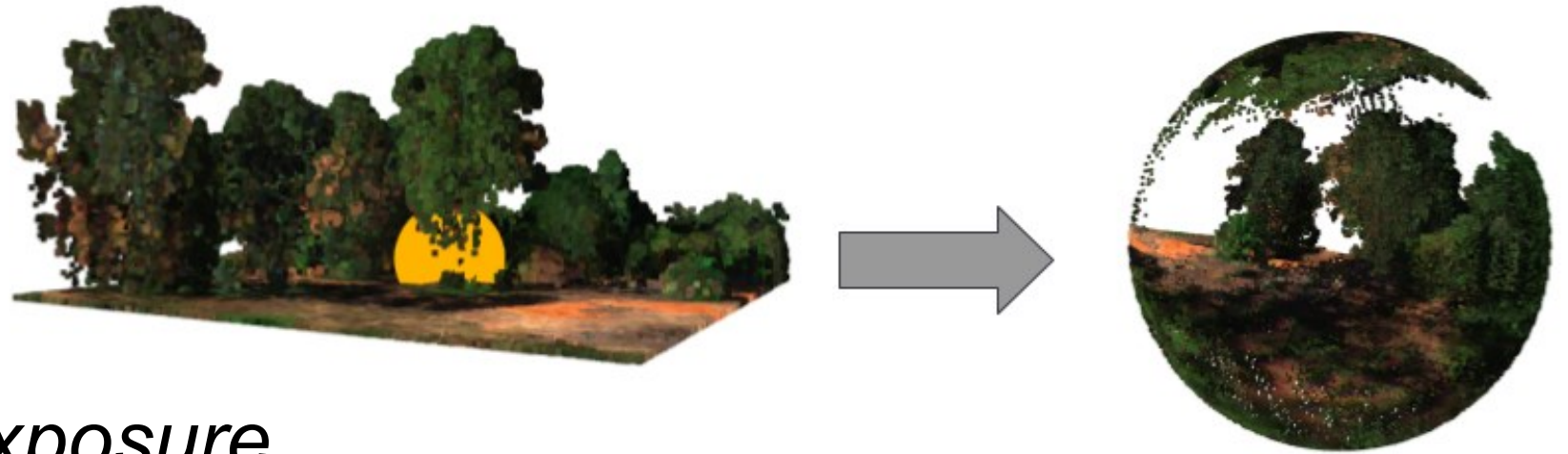
New Methodology:

- Python 3.5 Code Combines all Steps
- Input Stream Lines and LiDAR Data
- High-Resolution Outputs
- LAS or Raster-Based Analysis Option

Effective Shade:



Hemispherical Photo Simulation



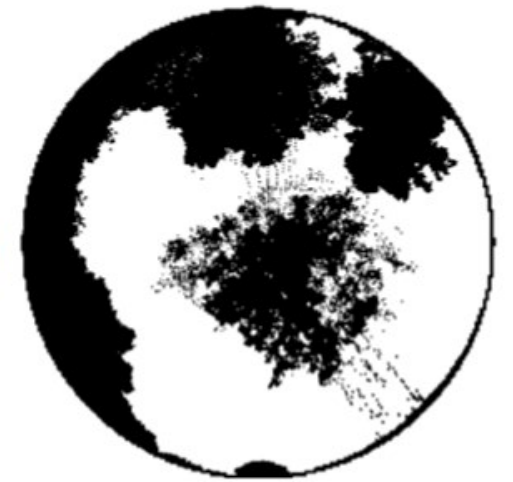
- 1) *Sufficient solar exposure*
- 2) *Sufficient wind shelter*



A



B



C

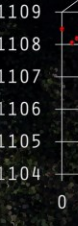
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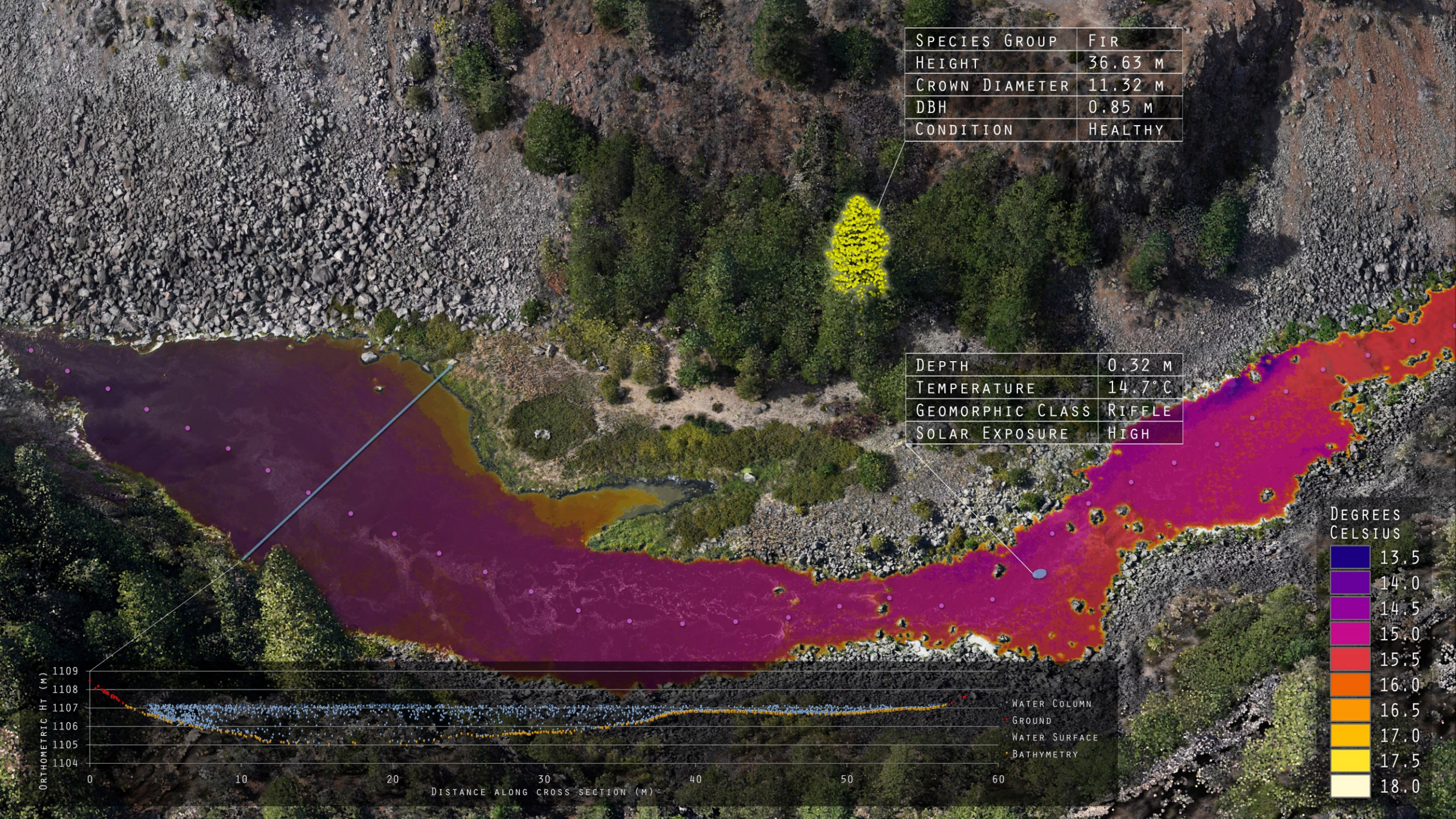
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THANK YOU

*Questions, Suggestions,
Comments, Ideas?*

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