2UAS

The Drone Group

What We Do Well with UAS

- DEM (slope analysis, geomorphology)- especially drivers for hydrologic phenomena
- Vegetation health
- Surface-related boundary conditions
- Filling spatial resolution gaps (between point to satellite)
- Seasonal dynamics
- Response to extreme events
- Hot spots assessment

What We Need Improvement

- Battery life affecting drone flight/coverage
- Cannot penetrate surface (ground/vegetation)
- Steep learning curve (personnel requirements, knowledge, preparation time, mission planning)
- Weather considerations (flight stability and sensor requirements)
- Post-processing requirements

What We Did

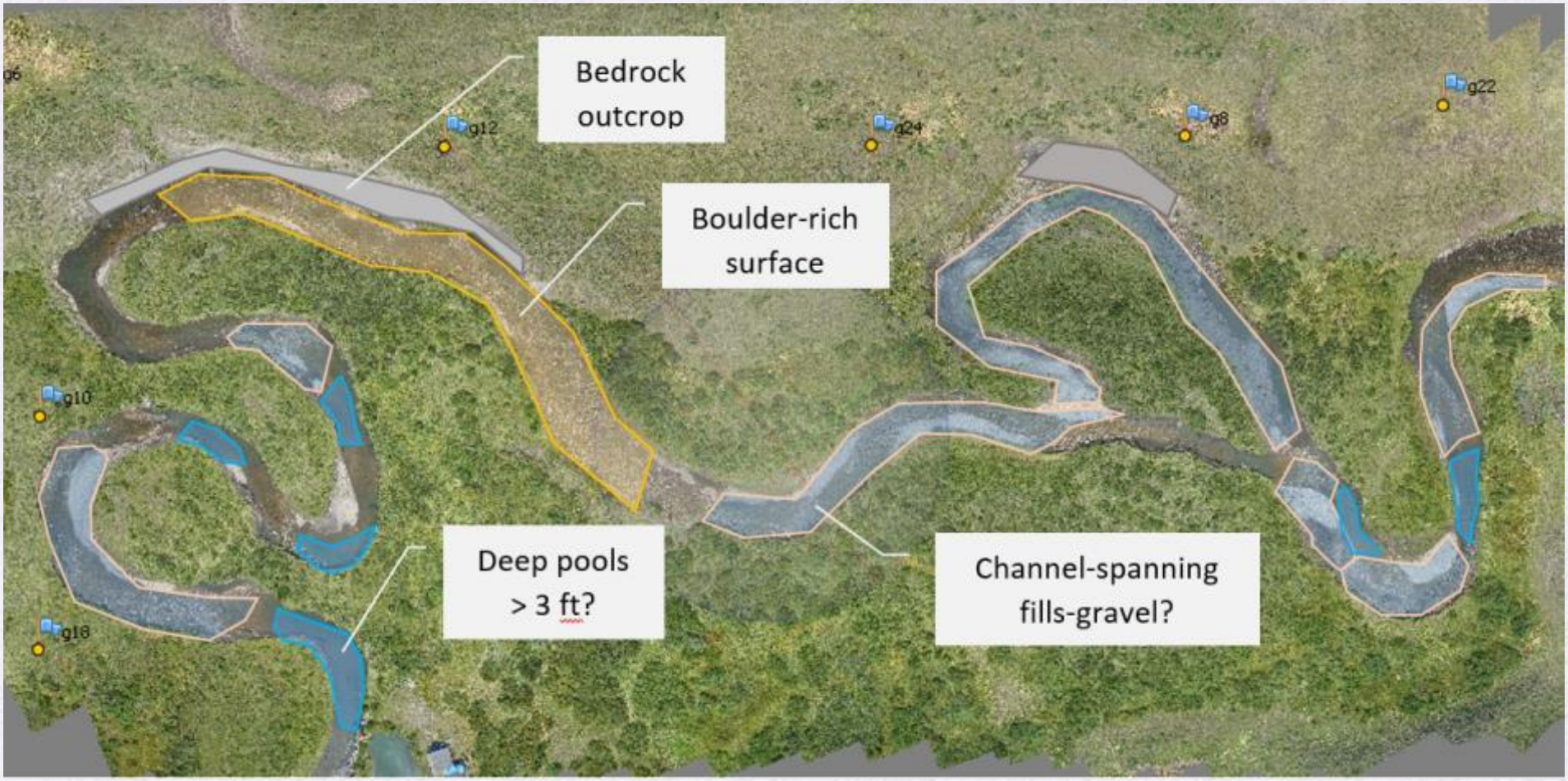
- 2 raster flights spanning meanders of interest →
  - Sony A5100 for DEM recreation
  - Micasense Rededge for multispectral vegetative analysis

← Quadcopter on lunch break.

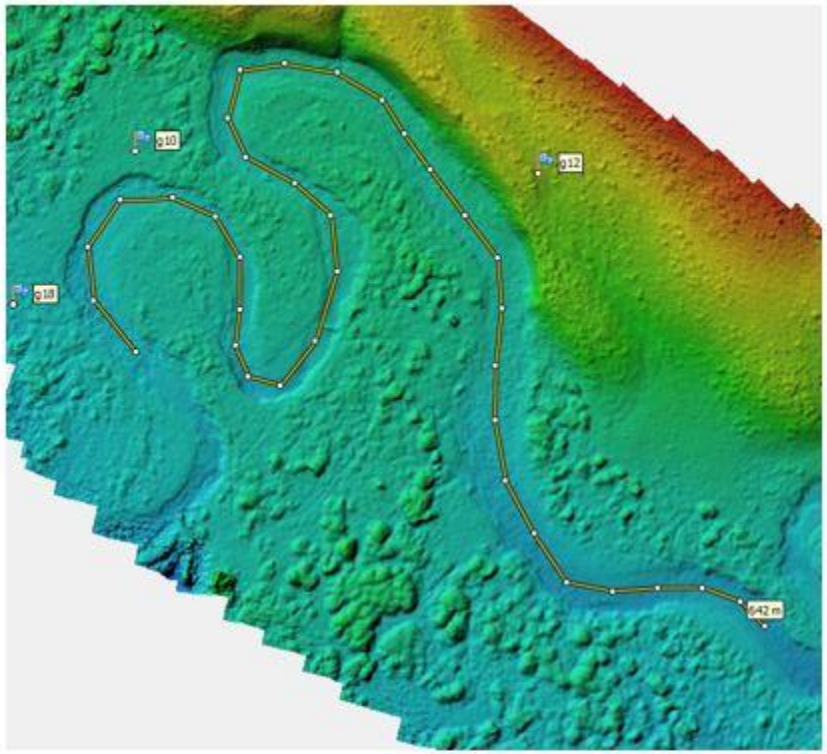
Data Products

- Stitched imagery (342 photos) of field site
- Qualitative identification for points of interest
- DEM analysis
- Multispectral analysis- using vegetation as identifiers for lateral hyporheic exchange

Imagery identification



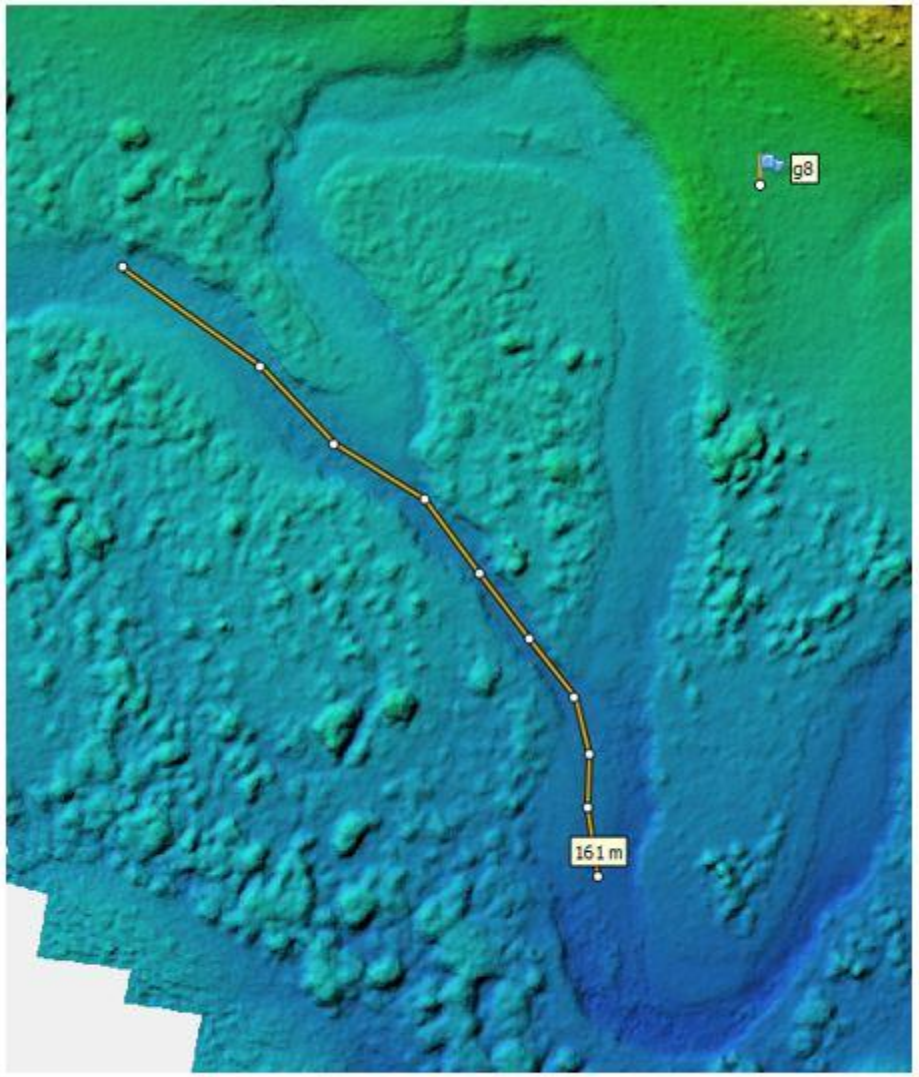
DEM analysis (Go to software)



UPPER REACH THALWEG SLOPE~0.001

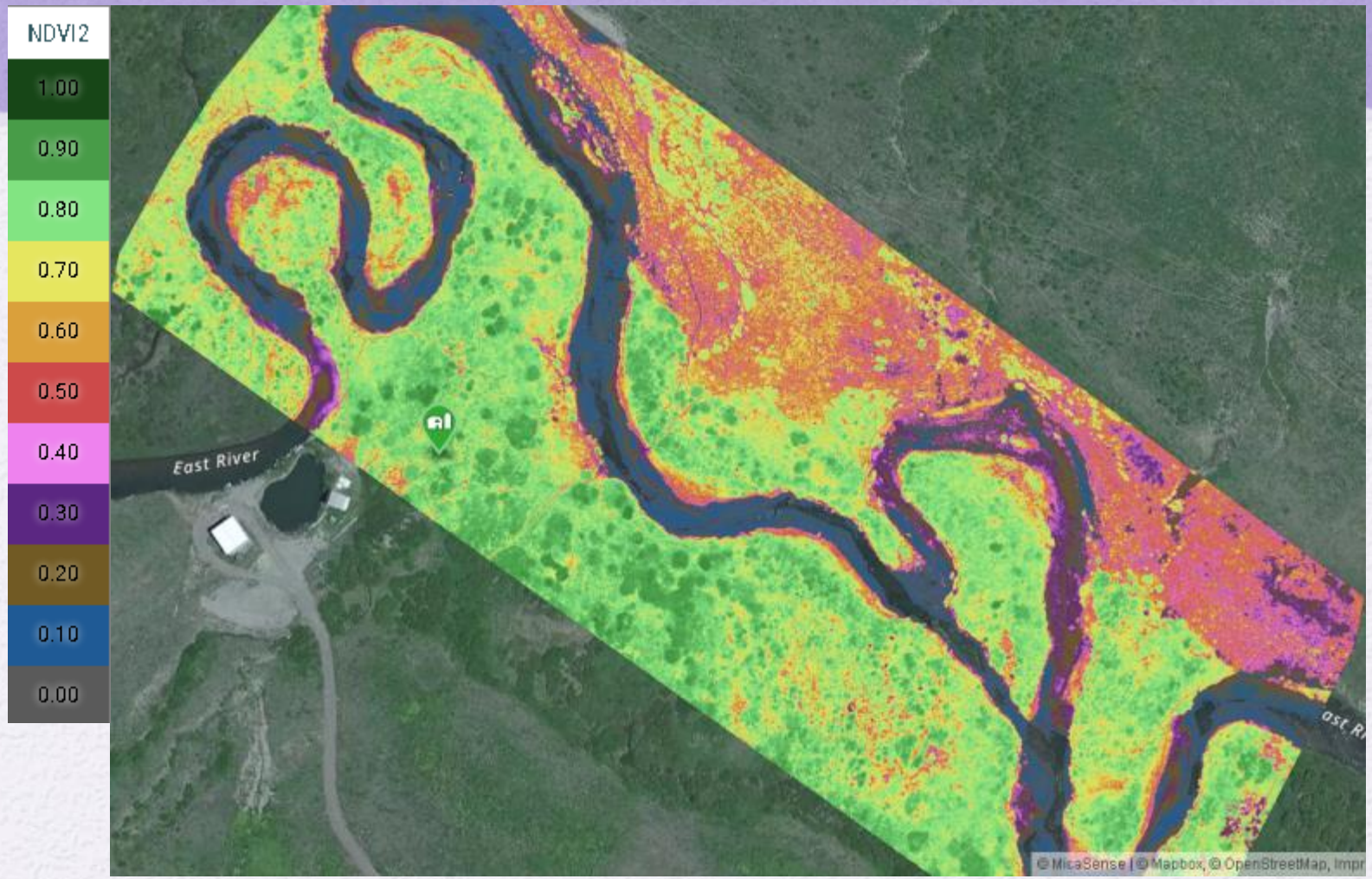
OVERALL THALWEG SLOPE ~ 0.002
(1.07 km reach)

Valley Slope ~ 0.005
Sinuosity ~ 2.3



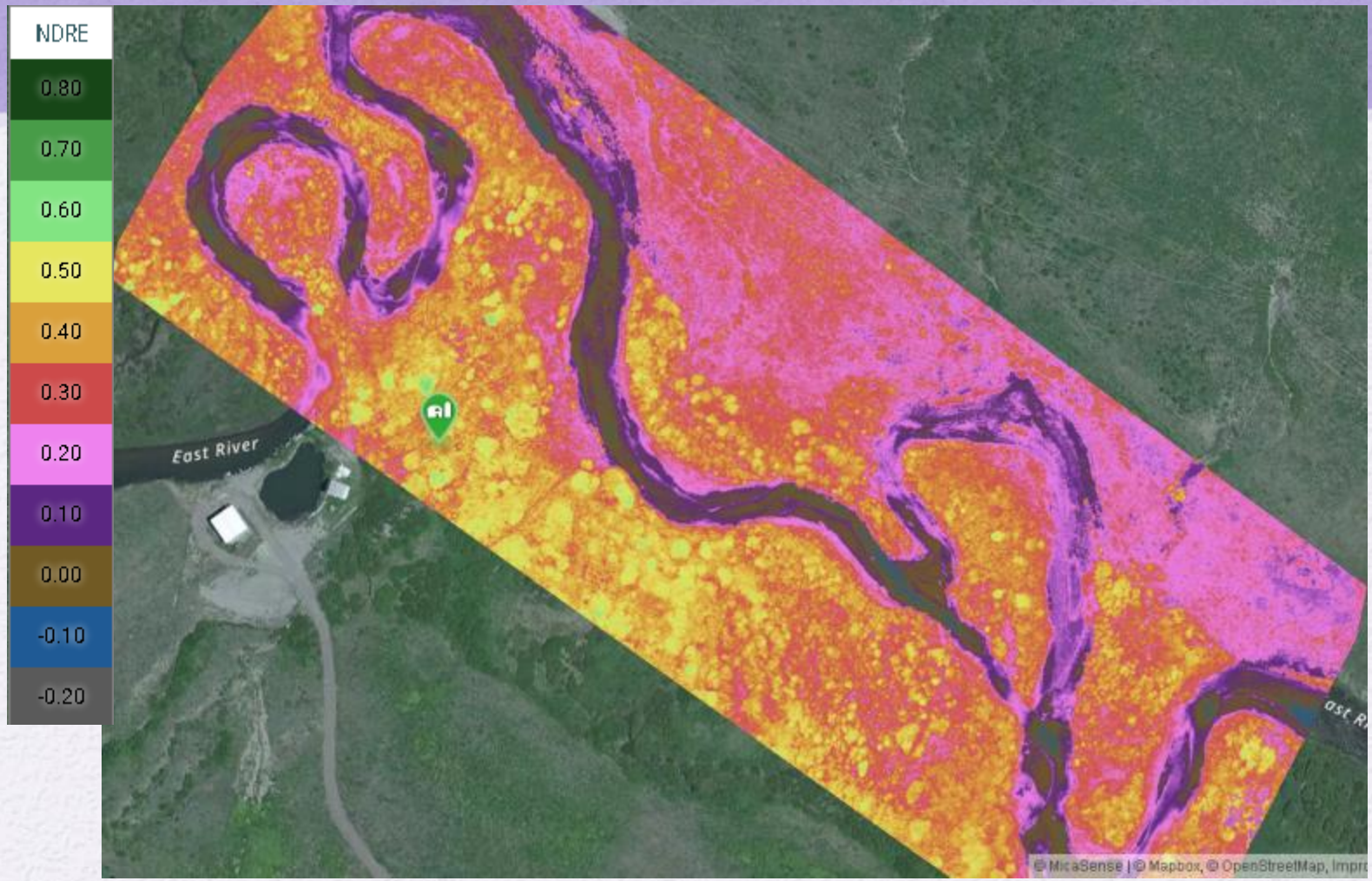
OXBOW CUTOFF CHUTE SLOPE ~ 0.01

Multispectral- NDVI



- Vegetation: NDVI > 0.5 (above Red)
- Proxy for vegetative health

Multispectral- NDRE



- Normalized Difference Red Edge Index (NIR and Red Edge bands)
- More “valuable index” monitoring stress/health for mature plants

Summary & Potential Future Analyses

- UAS provided impressive initial snapshots at high resolutions for DEM and spectral analysis
- Compare w/ other groups (surveyed locations) and relations of GW-SW exchange hotspots with river and sediment structure
- Further spectral analyses (single/multi-band analyses) and interpretation identifying potential vegetative interactions with local hydrology

Other things we did (can cut)

- DJI flight videos (skip if played already…)

DJI (↑) Phantom 3 spying on Raz injection spots (→)

Extra slide Multispectral-NRG

- Near Infrared/Red/Green
- Red = amount of Near IR reflected
- Green = amount of Red reflected
- Blue = amount of Green reflected