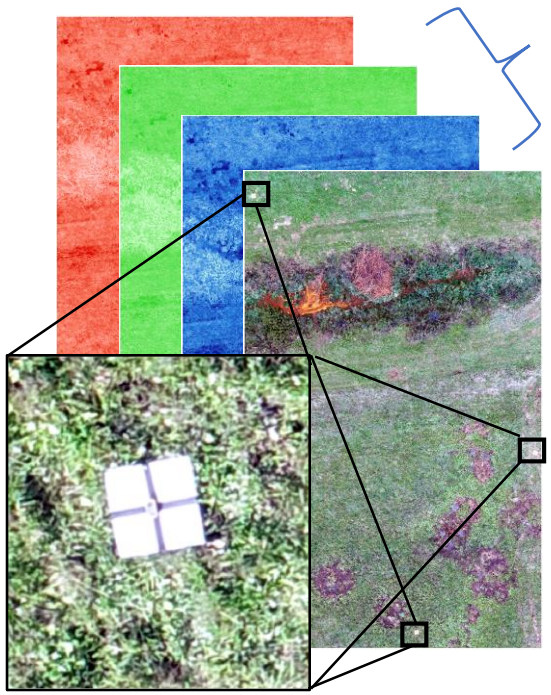
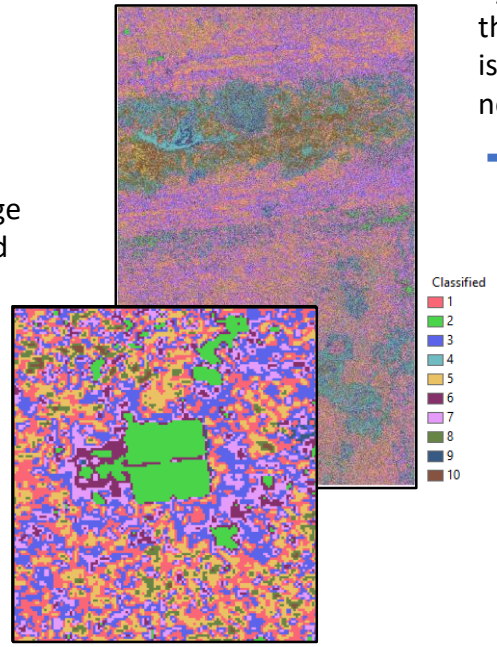
An Automated Process for Georeferencing Drone Imagery to Ground Control Points

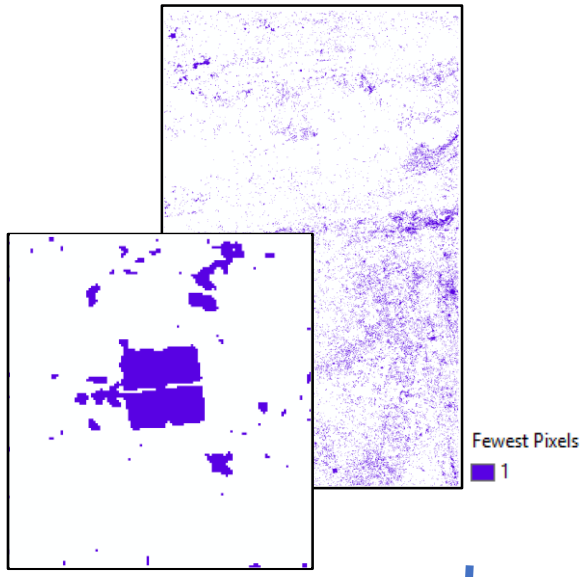
1) Drone imagery is acquired in the field. Coordinates of at least 3 GCPs are recorded with high-precision GPS. A point shapefile with these measured easting and northing values is fed into the tool. Red, Green, and Blue bands are also fed into tool.



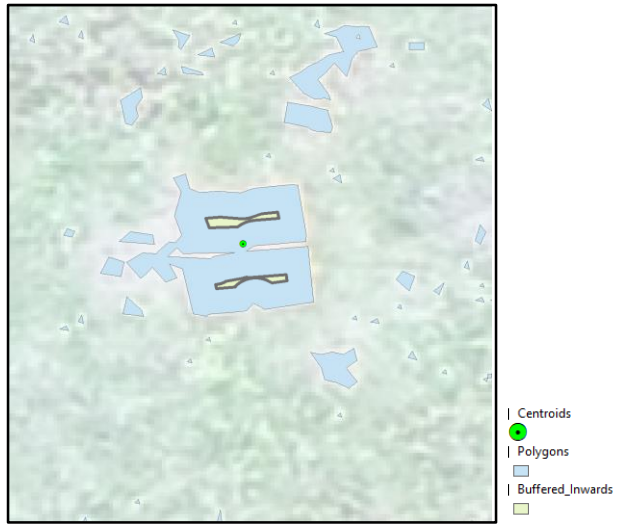
2) "NoData" pixels- pixels that have saturated the camera sensor during image acquisition- are reclassified to the highest possible reflectance value for each band (255). Bands are composited, and an "isodata" unsupervised classification is run on the composite, generating 10 random classes.



3) The class with the fewest pixels is exported to a new raster



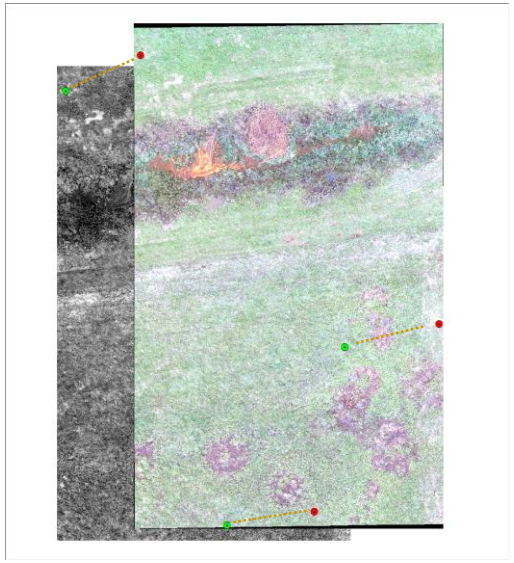
4) This raster is converted to a vector layer. Pixels are buffered inwards to remove any noise, and centroids are calculated from the buffered polygons



5) A spatial join is used whereby the centroids "learn" which GCP they are nearest to. Coordinates for the centroids and GCPS that are closest to one another are aligned in an attribute table.

GCPX	GCPY	CentroidX	CentroidY
641703	4645138	641694.855114	4645134.099715
641734	4645110	641724.290957	4645107.120918
641721	4645090	641711.903131	4645088.345723

6) Coordinates are extracted from the attribute table and used as input to a georeferencing operation (*warp*). The output is a georeferenced mosaic of the original bands.



FINISHED!

*Note: this tool will work with any drone data where the GCPs are a distinct color from their background environment, and coordinate measurements are taken in the field at GCP center. It prevents manual geolocation, which can be a tedious process if multiple drone image mosaics need processing.

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