

# Elevation QA Review Report

**Project:** CO\_GrandCounty\_2010 **Contract ID:** 1100116

**Liaison:** John Murphey **Partner(s):** **Contractor:** Aero-Metric, INC.

**Data Delivery Date:** January 3, 201 **Date Data Reviewed:** January 10, 20

**Reviewer:** Kimberly Robinson **Total Square Miles Reviewed:** 438 sq. m

**Elevation Type:** LIDAR **Format:** .img **Grid Spacing:** 0.7 meters **Tile size:** 1500 x 15

**Projection:** UTM **Zone:** 13 **Datum:** NAD83 **Units:** Meters

**Licensing:** Public Domain **Metadata:** Project Level

## Materials Received:

Breakline Shapefiles  
Classified .las files  
Control Check files (control points)  
Bare Earth .img files  
Intensity files

**Vertical Accuracy Test Performed:** Yes **Test Point Source:** Contractor **RMSE:** 0.056

## Vertical Accuracy Test Notes:

20 test points were provided in .shp format. No vertical accuracy test points were located in the small area of interest in Larimer county, so vertical accuracy for this area (Larimer county) could not be determined. I have included an updated vertical accuracy points shapefile with coordinates, lidar block, diff in z and diff in z squared on the external hard drive provided to USGS.

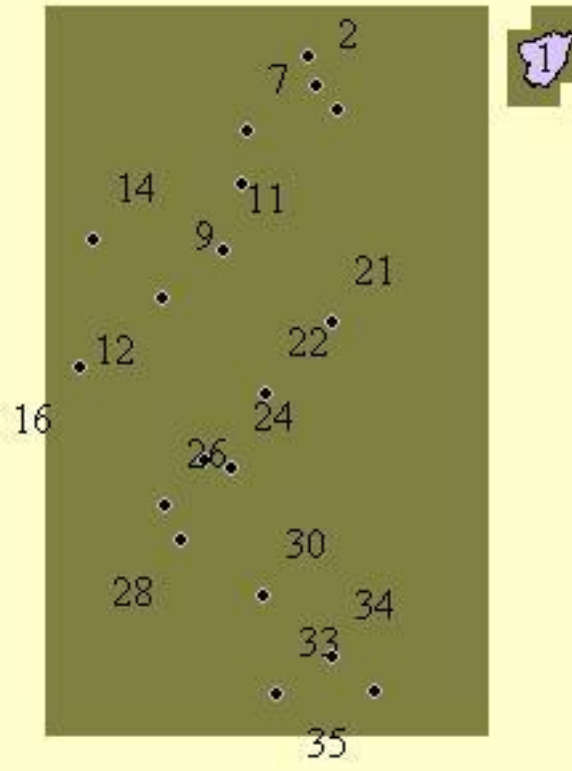
## QA Review Summary:

All of the Colorado Grand County/Park County/Larimar County data was reviewed. No tile index shape file was sent with this data. No bounding shapefile for Grand County was sent with this data. This data was brought into Global Mapper as .img files. Errors were found throughout this project. There are possible seamlines in the data, water bodies greater than 2.0 acres that are not leveled, and one area where lidar elevation was significantly different than surrounding points with no explanation. I have included shapefiles that encompass the above areas on the external hard drive received. I regridded this data to 1/9th arc deg files in an attempt to fill in the missing data at possible seamlines, however, was unsuccessful. This data is rejected.

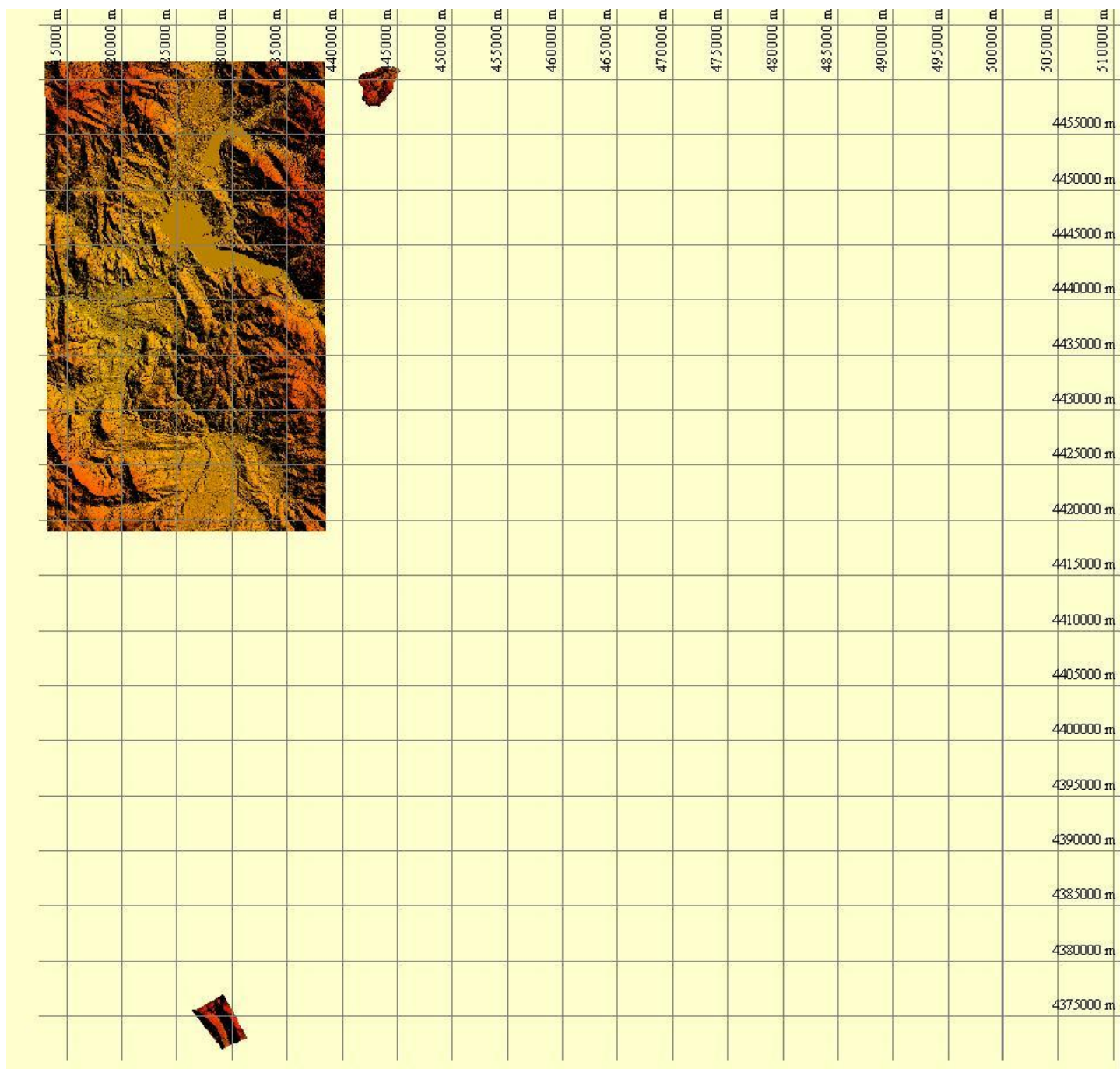
See JPEG examples low.

**CONCLUSIONS:** 1. 95 % of artifacts removed  
2. 95 % of vegetation penetrated  
3. 98 % of buildings removed

CO Grand County Project Area



# CO Grand County Project Area

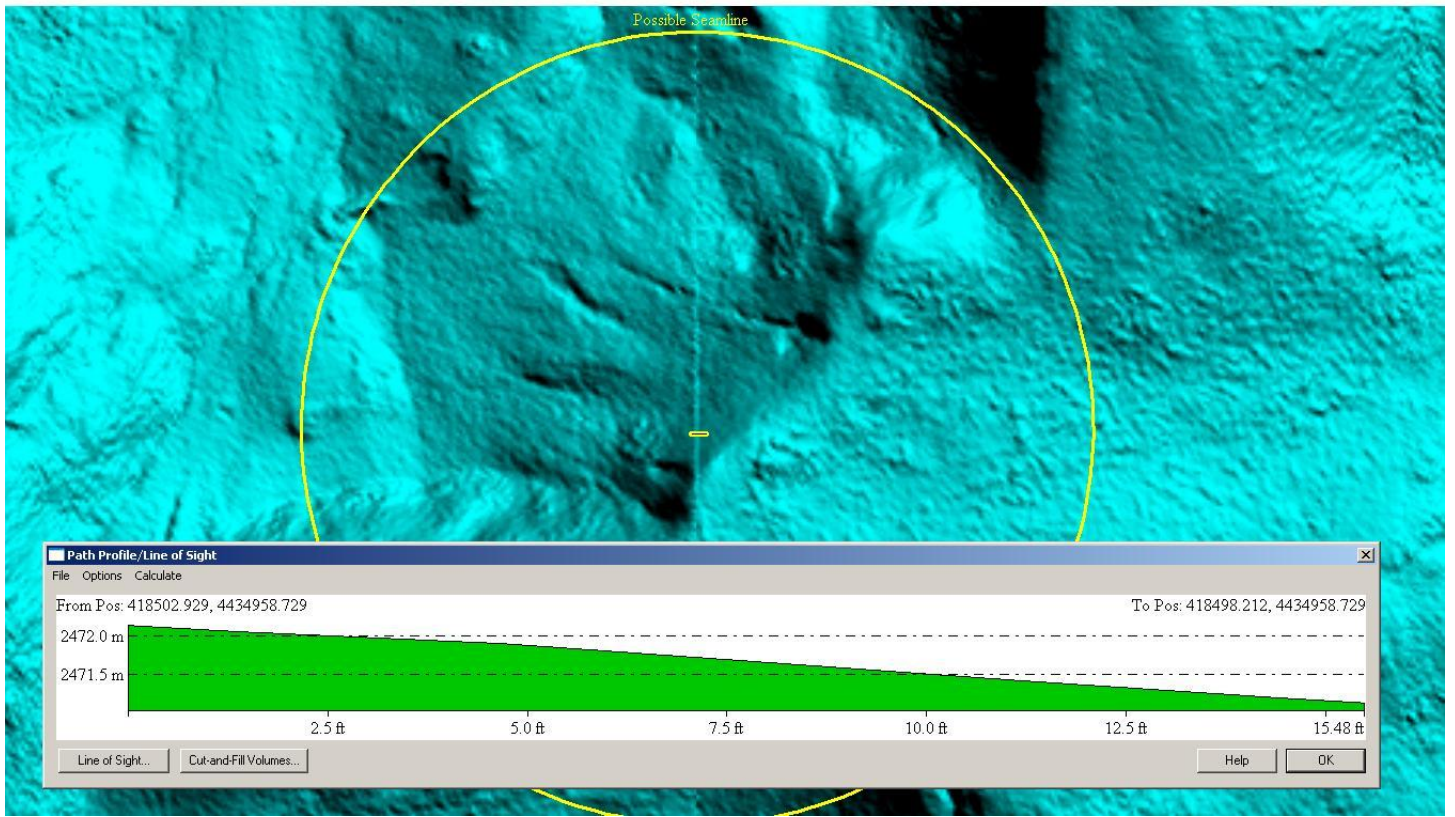
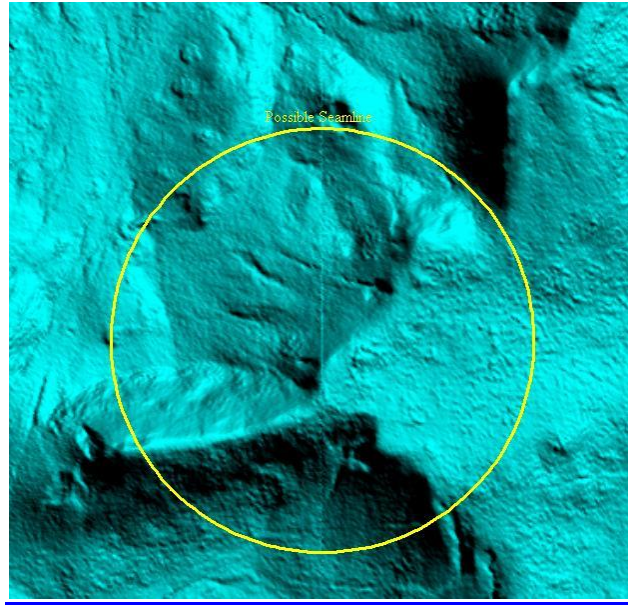


## CO Grand County Vertical Accuracy Testing Worksheet

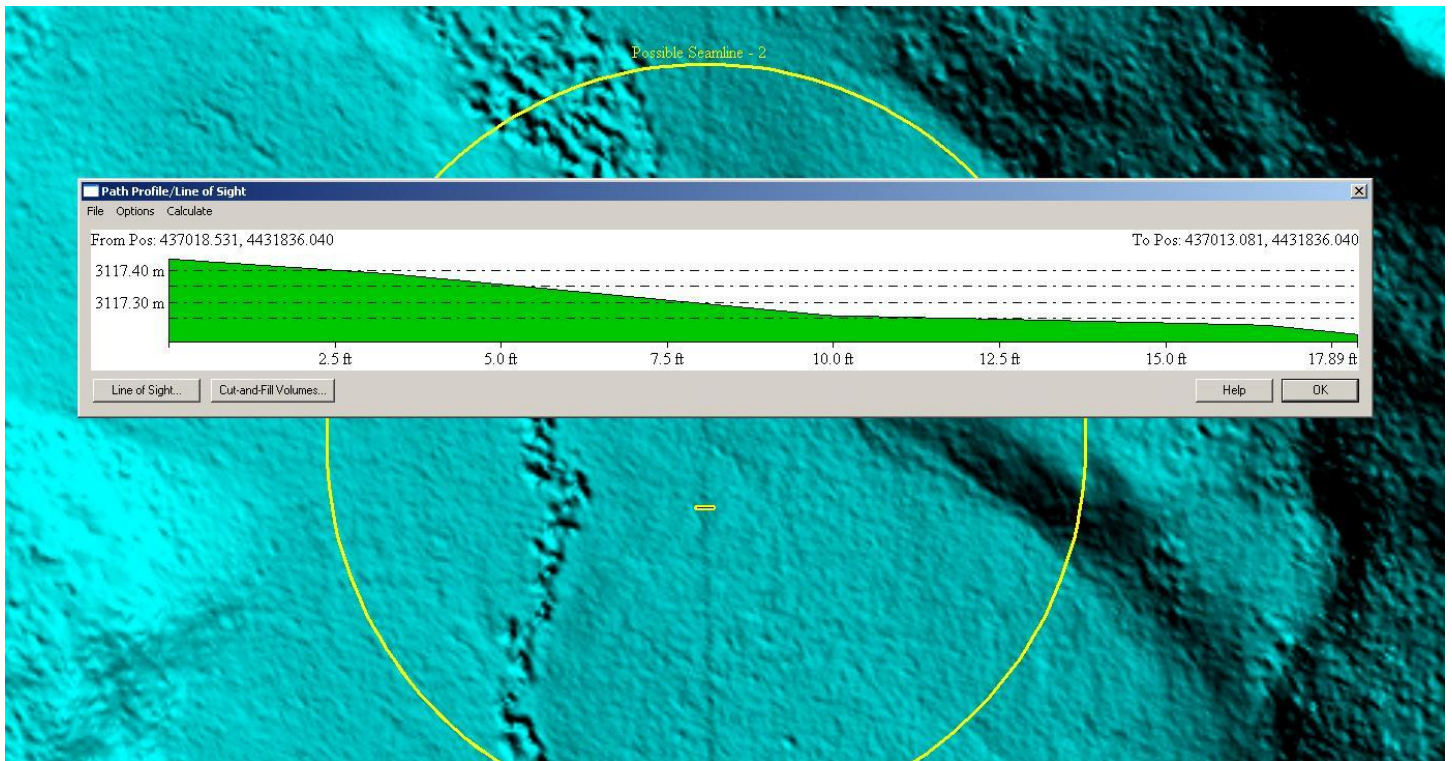
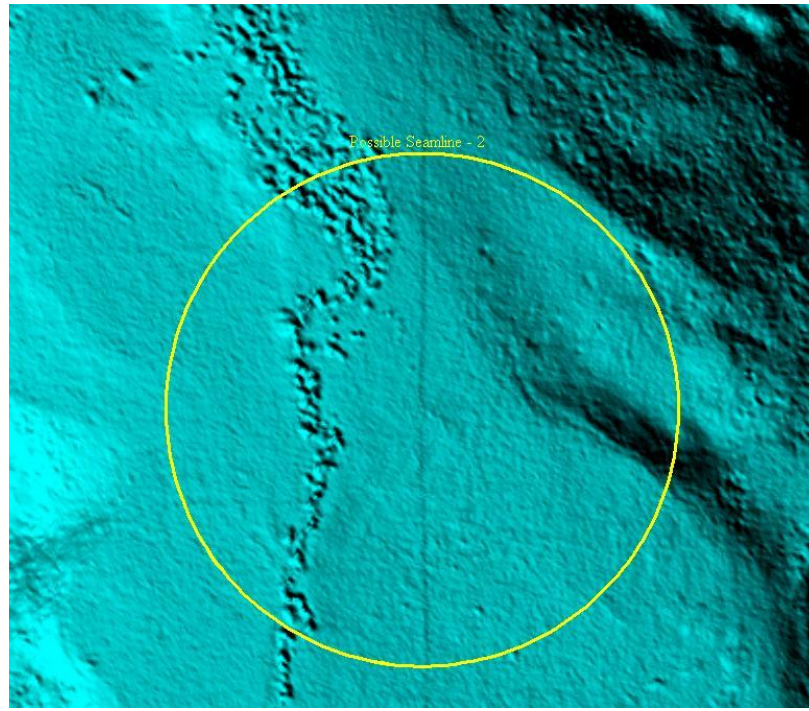
Vertical Accuracy Statistic Worksheet								
COLORADO GRAND COUNTY								
Point number	Easting UTM (m)	Northing UTM (m)	Point description	Lidar Block	z Test point value (m)	z Lidar value (m)	diff in z	(diff in z) <sup>2</sup>
1	4459433.599	428723.152	Unknown	Grand County	2653.569	2653.654	-0.085	0.007
2	4457642.824	429212.687	Unknown	Grand County	2658.460	2658.486	-0.026	0.001
7	4454893.278	424939.954	Unknown	Grand County	2778.428	2778.455	-0.027	0.001
9	4451528.620	424610.627	Unknown	Grand County	2620.656	2620.658	-0.002	0.000
11	4447349.014	423307.270	Unknown	Grand County	2533.983	2533.963	0.020	0.000
12	4444458.632	419661.499	Unknown	Grand County	2484.116	2484.123	-0.007	0.000
14	4448002.782	415354.379	Unknown	Grand County	2516.179	2516.097	0.082	0.007
16	4440217.573	414580.477	Unknown	Grand County	2378.270	2378.230	0.040	0.002
18	4456072.052	430455.848	Unknown	Grand County	2558.540	2558.595	-0.055	0.003
21	4442938.063	430153.223	Unknown	Grand County	2556.182	2556.260	-0.078	0.006
22	4438486.713	425949.906	Unknown	Grand County	2596.993	2597.037	-0.044	0.002
24	4433870.744	423798.627	Unknown	Grand County	2596.138	2596.098	0.040	0.002
26	4431618.213	419819.121	Unknown	Grand County	2484.253	2484.125	0.128	0.016
28	4429493.045	420811.480	Unknown	Grand County	2583.335	2583.351	-0.016	0.000
30	4425994.482	425787.994	Unknown	Grand County	2577.914	2577.906	0.008	0.000
33	4419914.274	426603.500	Unknown	Grand County	2695.114	2695.109	0.005	0.000
34	4422237.032	430173.170	Unknown	Grand County	2610.842	2610.885	-0.043	0.002
35	4420057.463	432691.881	Unknown	Grand County	2656.175	2656.198	-0.023	0.001
37	4434409.362	422196.759	Unknown	Grand County	2536.779	2536.710	0.069	0.005
42	4376076.535	428443.961	Unknown	Grand County	3688.249	3688.340	-0.091	0.008
							sum	0.062
							average	0.003
							RMSE	0.056
							NSSDA	0.109

**Outlier: a control point located in an area that does not reflect the true ground elevation, i.e. bridges, etc.**

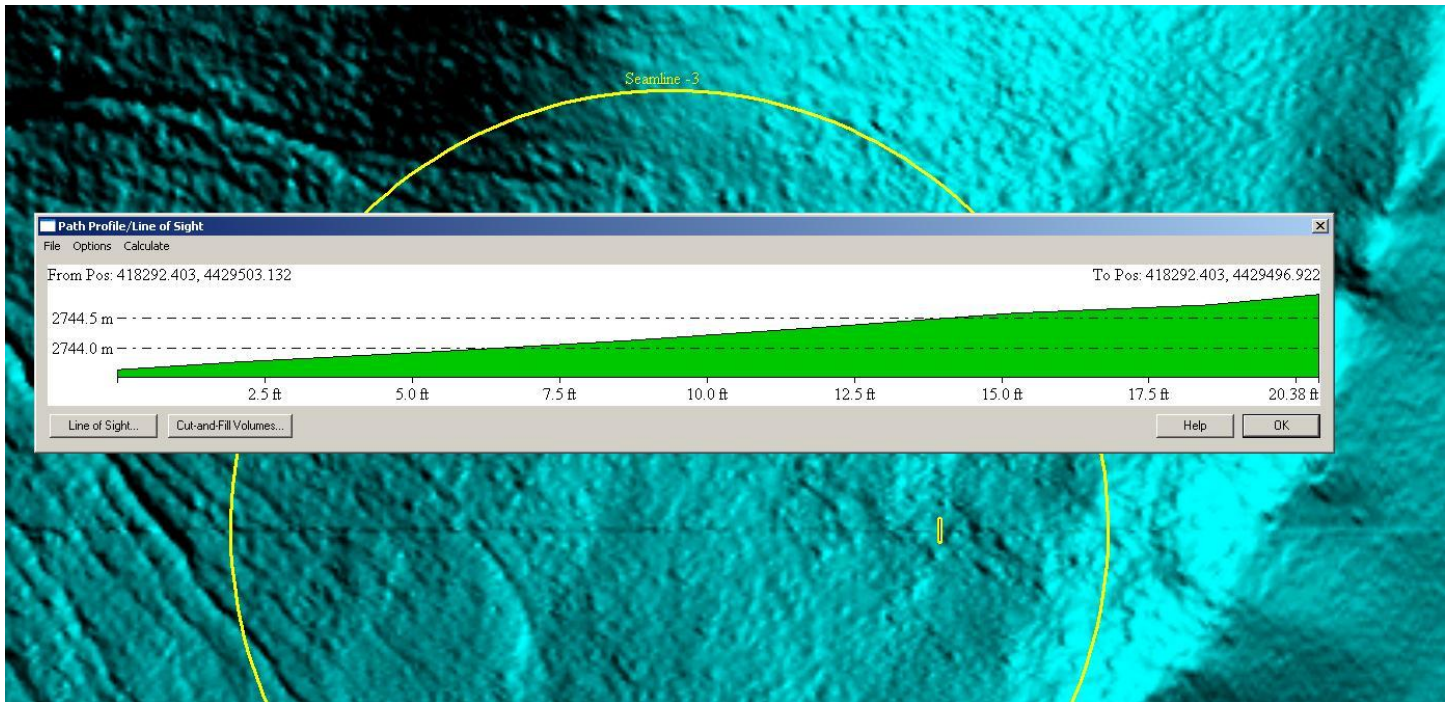
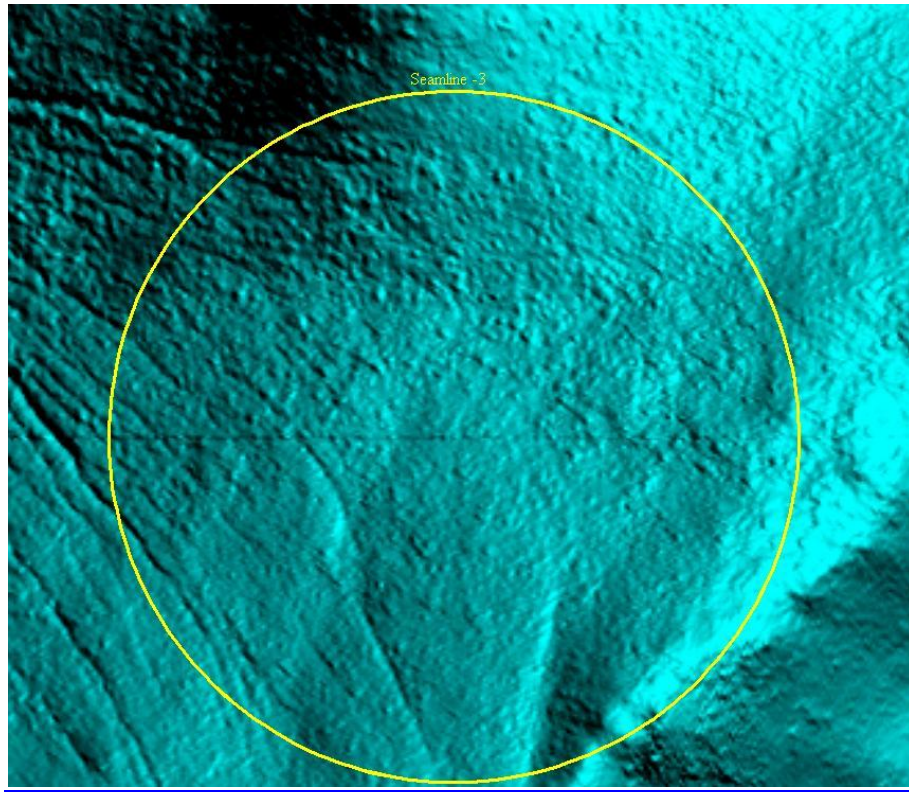
# CO Grand County Errors: Seamline Example 1



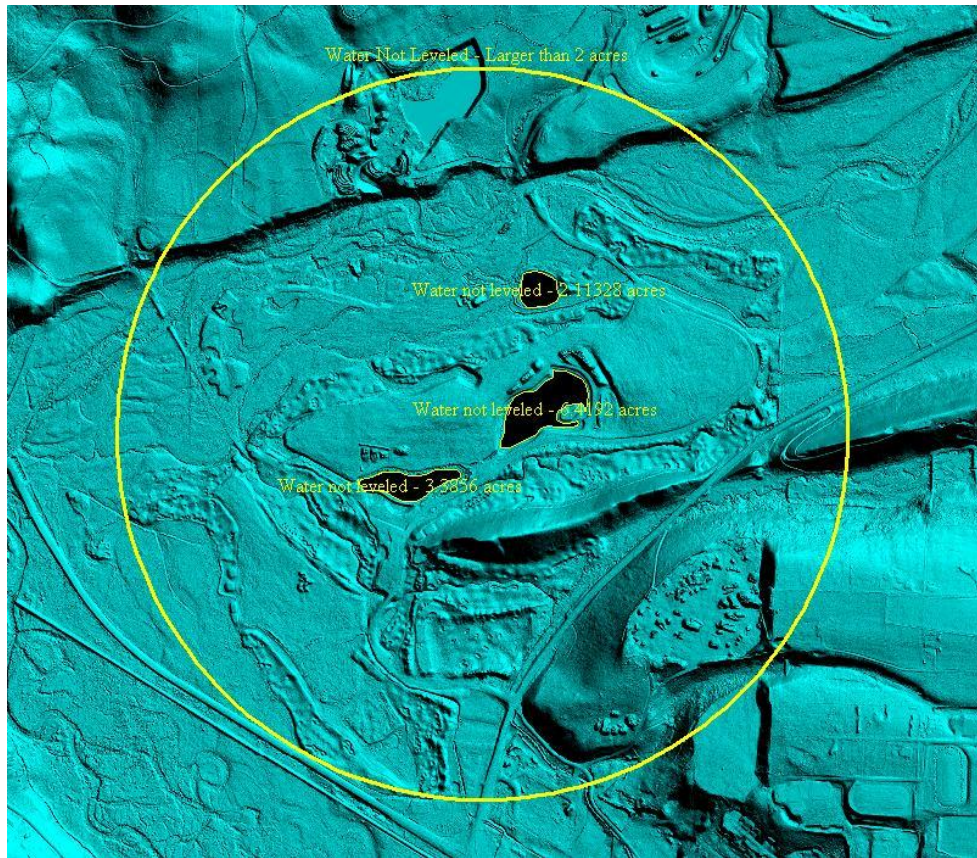
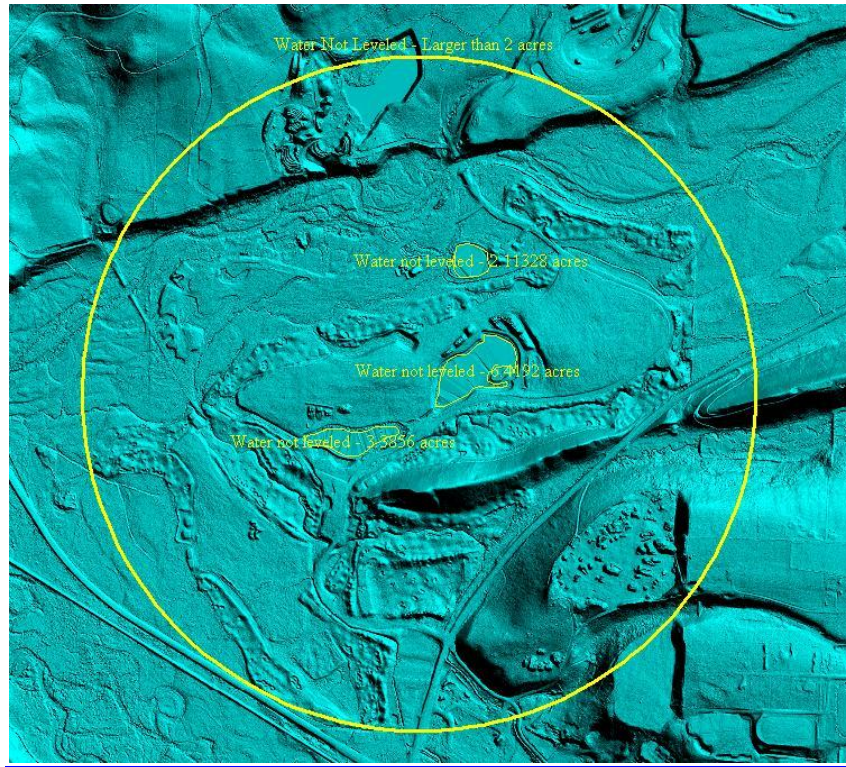
# CO Grand County Errors: Seamline Example 2



# CO Grand County Errors: Seamline Example 3

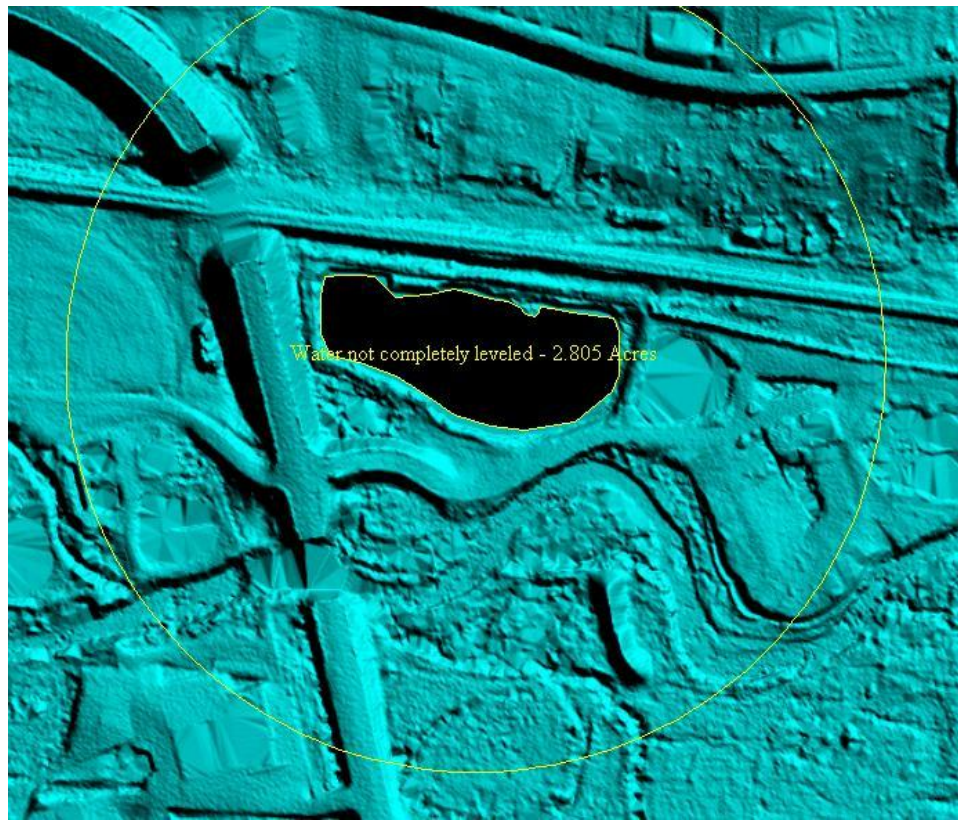


# CO Grand County Errors: Water Not Levelled Area 1

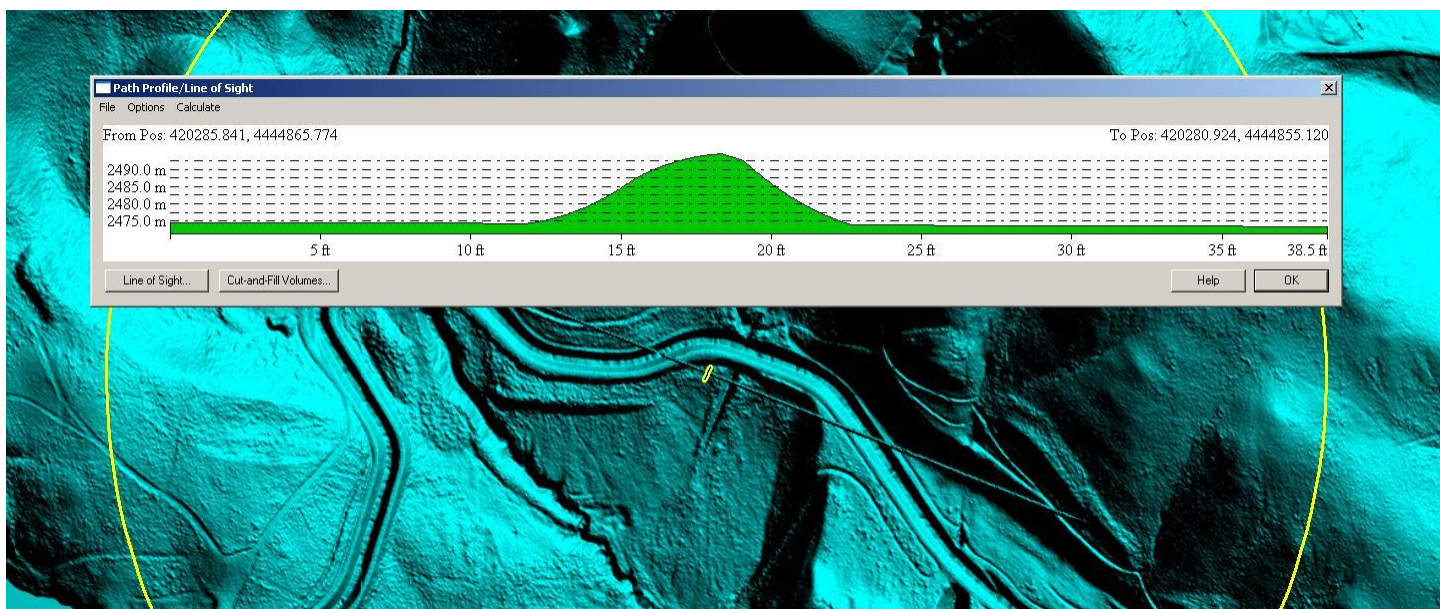
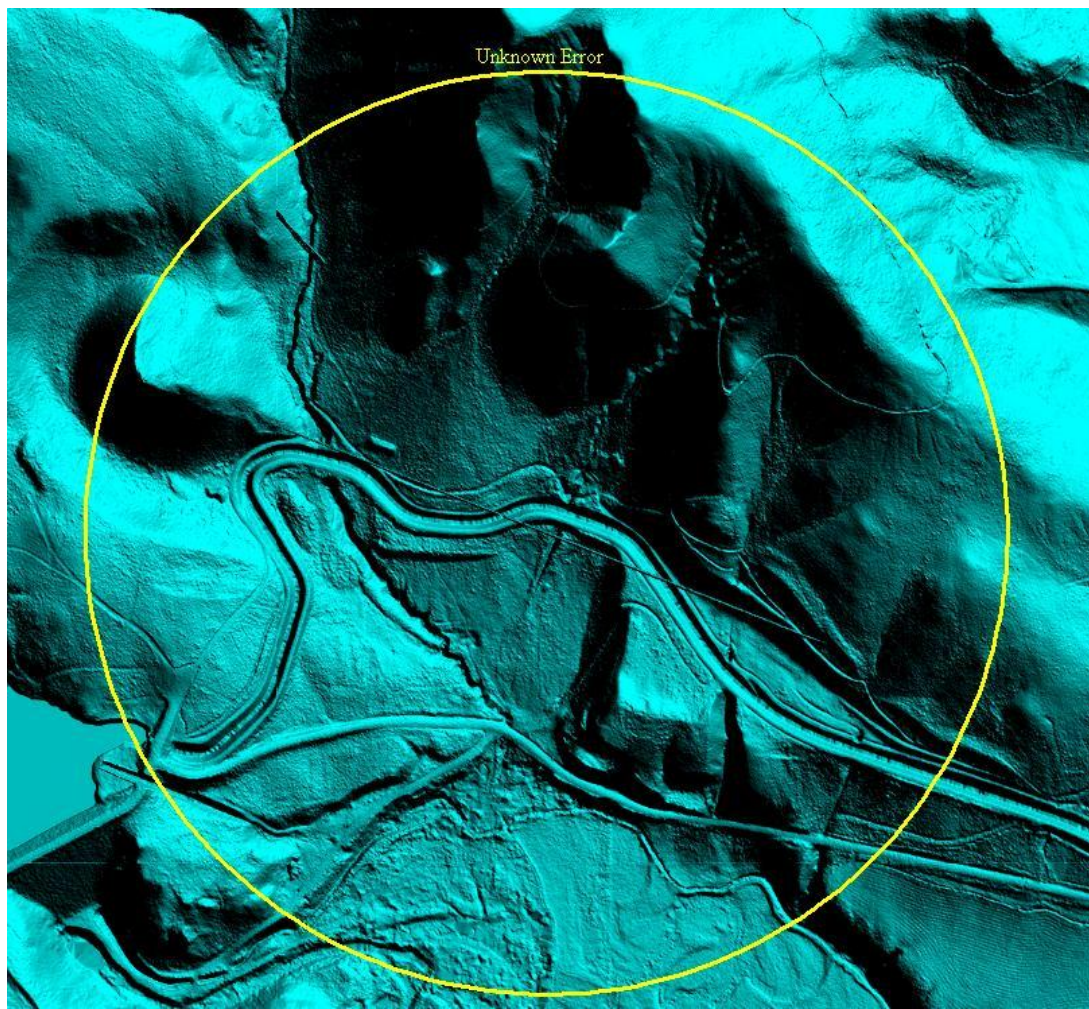




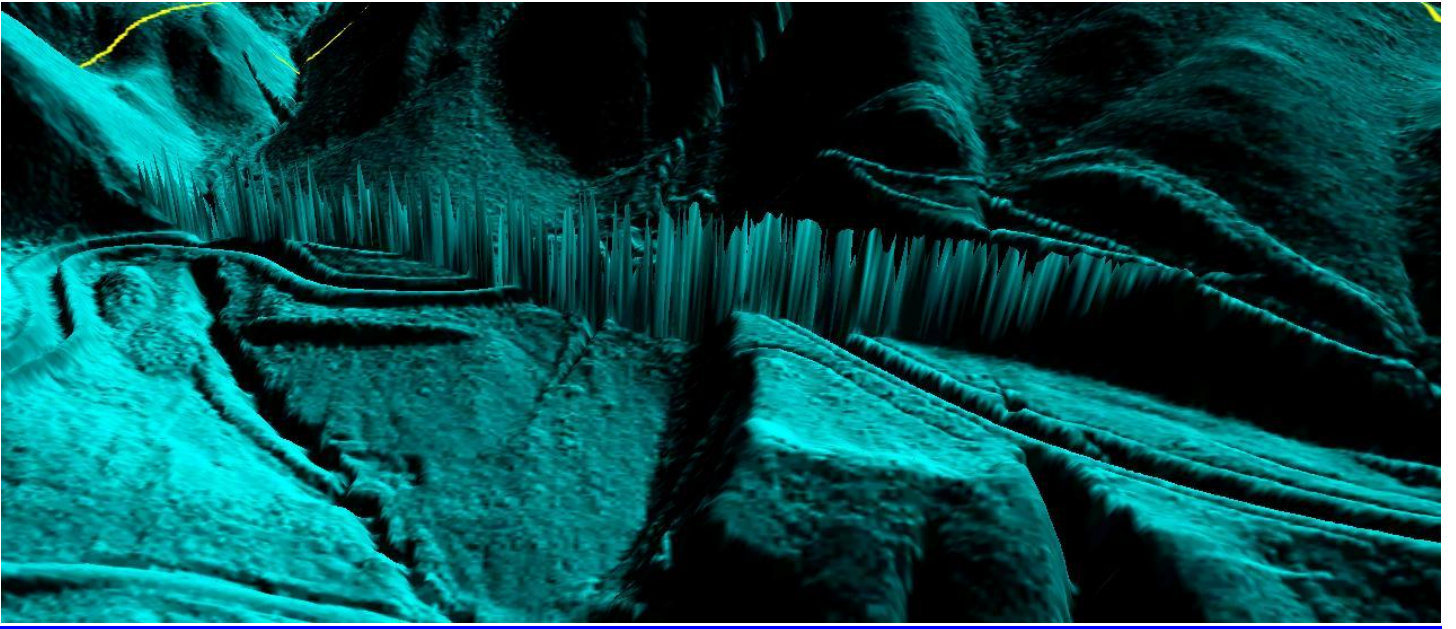
## CO Grand County Errors: Water Not Levelled Area 2



# CO Grand County Errors: Unknown Error



CO Grand County Errors: Unknown Error Continued



# **FIRST ADDENDUM TO ORIGINAL REPORT FOR COLORADO GRAND COUNTY LIDAR CO\_GrandCounty\_2010**

## **Data Corrections Received February 17<sup>th</sup> 2011. Reviewed on February 22<sup>nd</sup> 2011**

This is the second time the data for Grand County, CO has been reviewed. This is the second QA report completed for the project. All of the original errors noted in the first QA report have been corrected. The water bodies have been leveled where necessary and the lidar elevation error points were corrected. In addition, this data has no seamlines. All apparent seamlines are a result of the hillshade algorithm in Global Mapper.

The errors reported in the initial reviewing of this data were concentrated to four cells. While the errors have been fixed, these four cells are in the wrong projection (UTM NAD 1983 Zone 15) according to the metadata provided. Reviewer attempted to reproject data unsuccessfully. The four cells are DEM 3\_1704385; DEM 3\_1854385; DEM 3\_2004370; and DEM 3\_2004445.

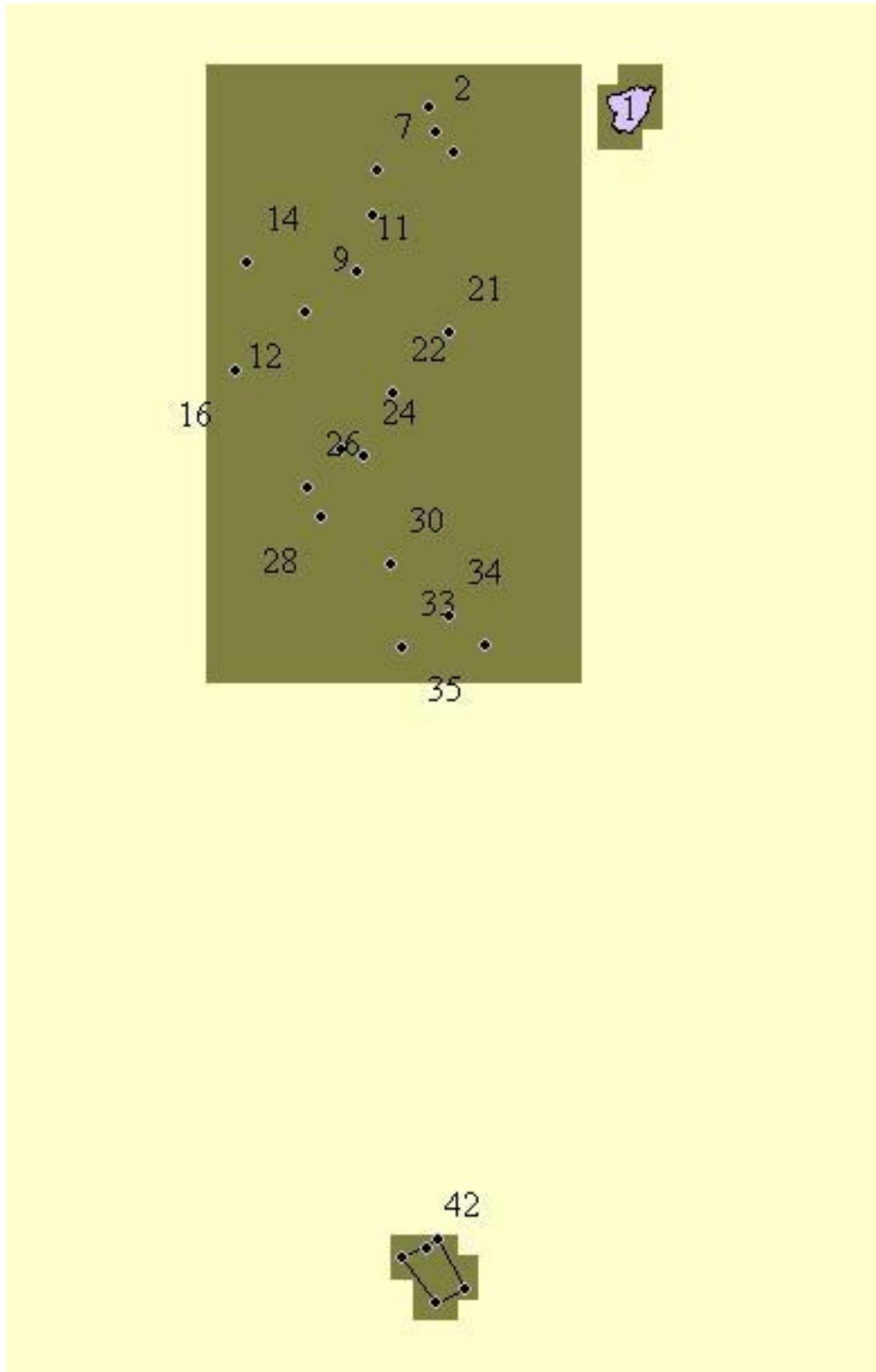
Once again, this is the second QC report completed for this project. The purpose of this QC report is to check that the original errors were corrected, and to call attention to the new errors in the data. The original QC report is included along with screenshots of this error on the external hard drive.

The data is in need of further corrections.

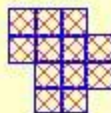
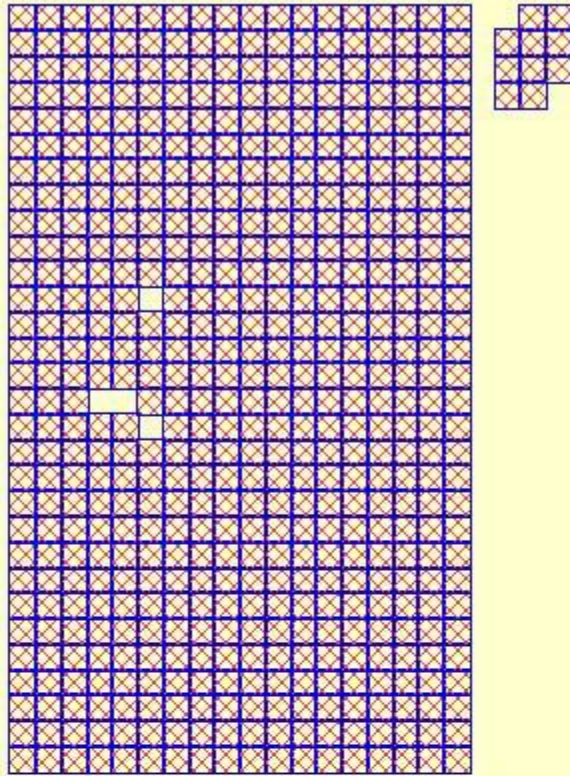
**See JPEG examples low.**

CONCLUSIONS: 1. 95 % of artifacts removed  
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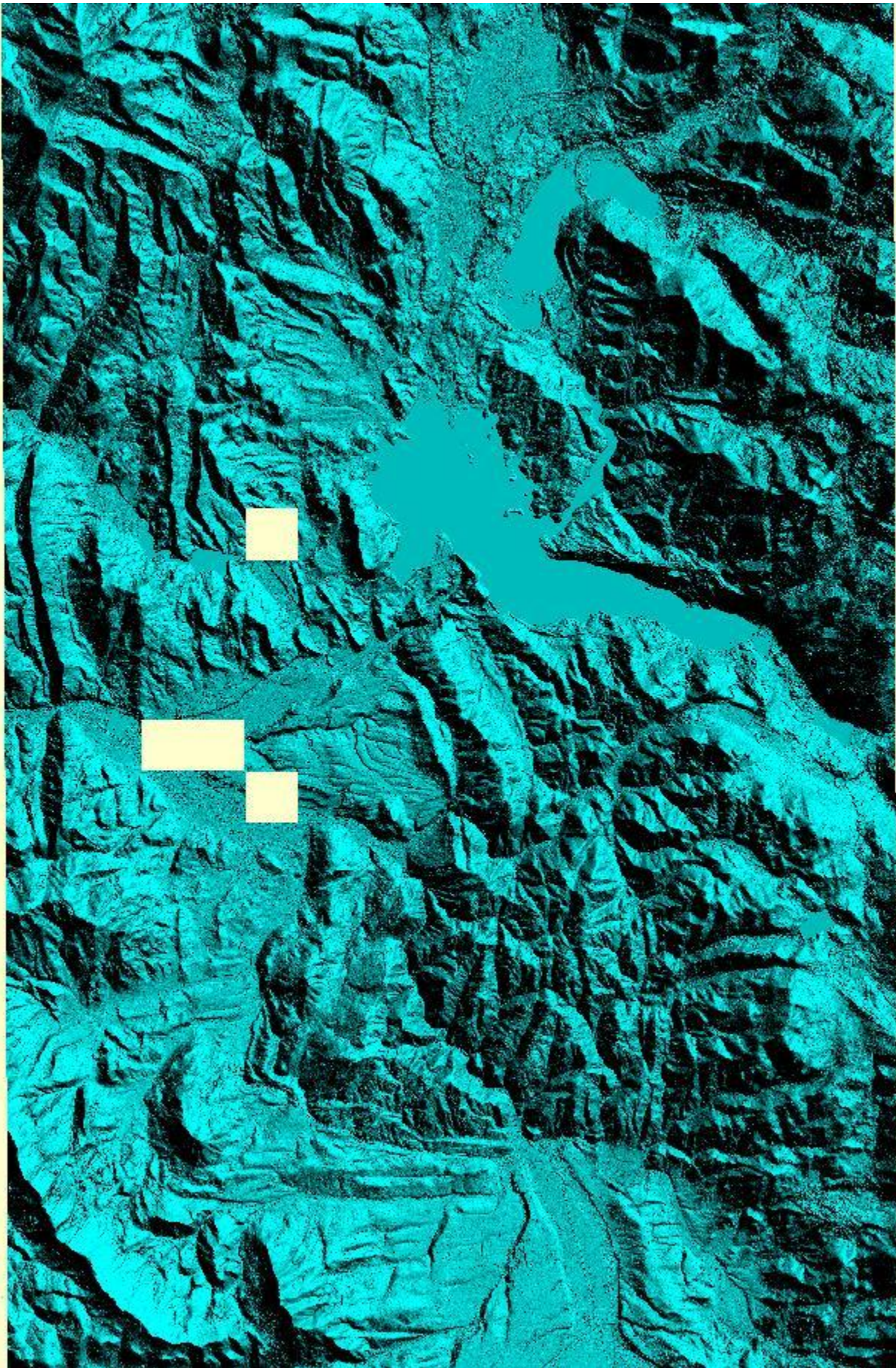
CO Grand County Original Project Area



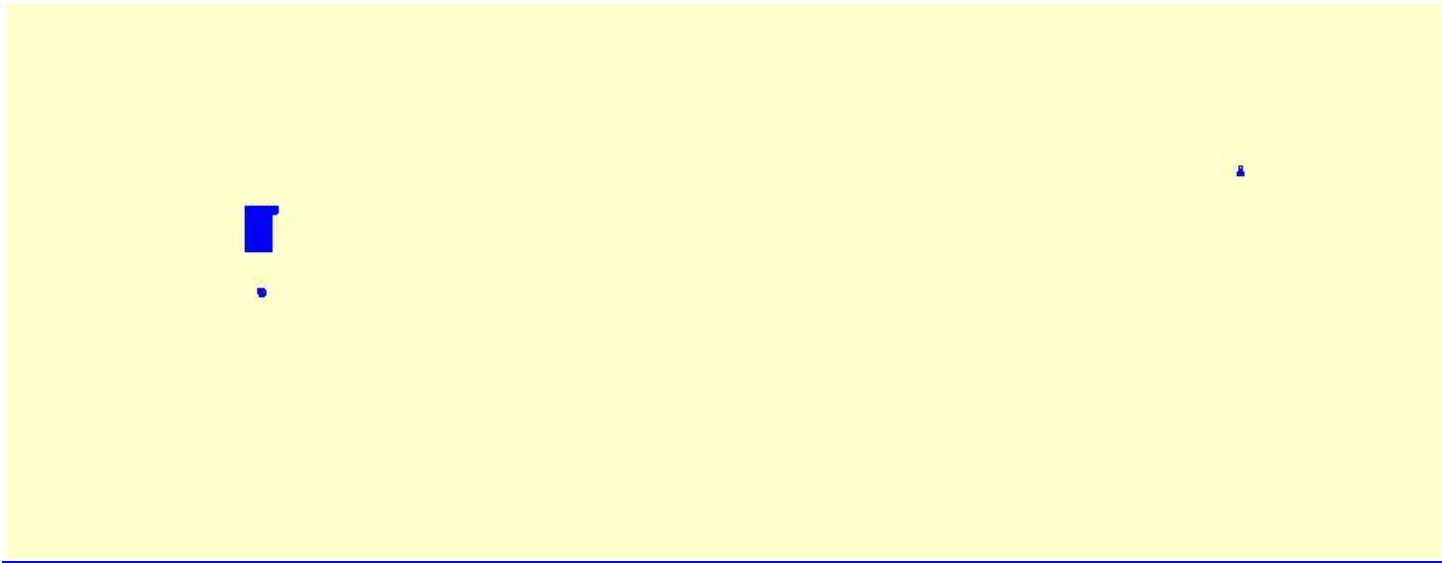
CO Grand County Returned Project Area with Corrections



CO Grand County Returned Project Area with Corrections Example 2

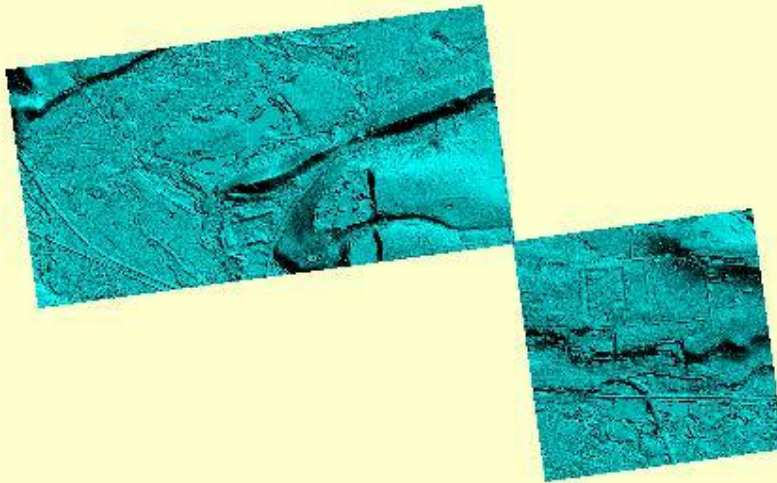
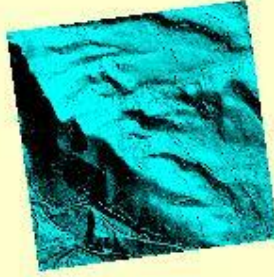


CO Grand County Corrected Cells: Actual Location of Missing Cells





CO Grand County Corrected Cells in Wrong Location



# FINAL ADDENDUM TO ORIGINAL REPORT FOR COLORADO GRAND COUNTY LIDAR CO\_GrandCounty\_2010

**Data Corrections Received February 28, 2011. Initial Review Conducted on March 7, 2011. Final Review on March 21, 2011**

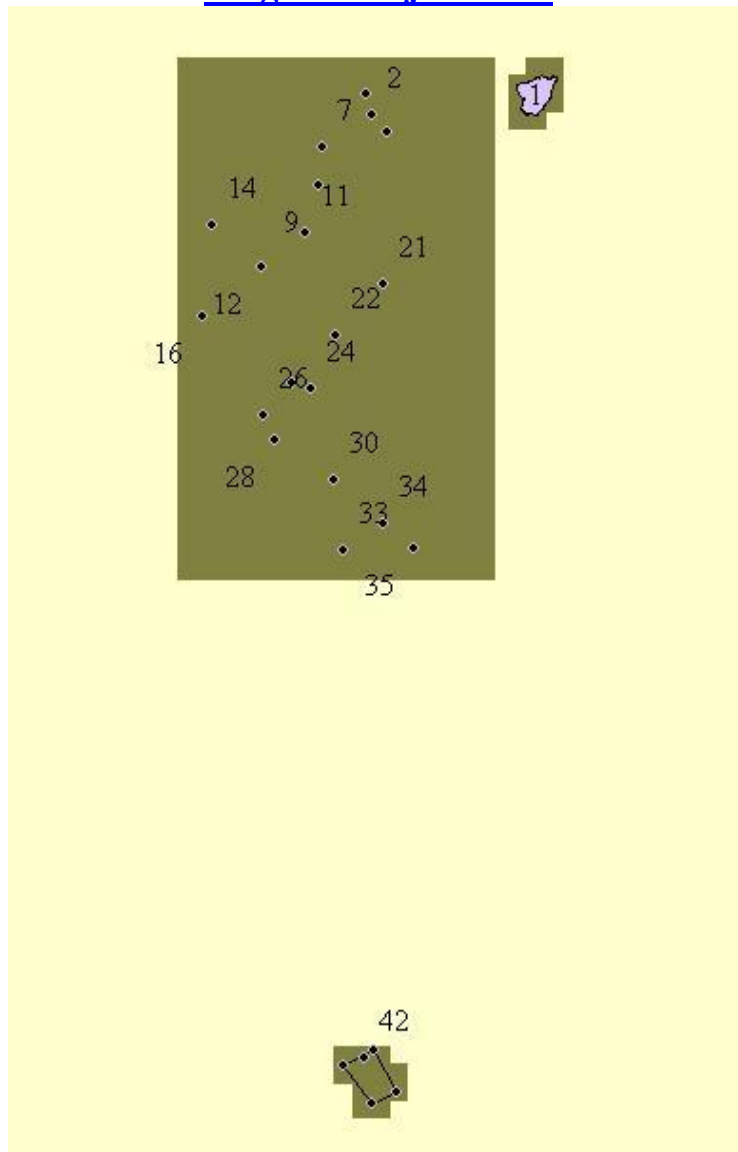
This is the final time the data for Grand County, Colorado will be reviewed. Original errors in .IMG shapefiles have been corrected. Projection errors in .img files have been corrected. Reviewer noticed on the final check that the tile shapefile was in the wrong projection (UTM NAD 1983 Zone 15). Reviewer requested new shapefile in UTM NAD 1983 Zone 13. New shapefile in correct projection was received on March 17, 2011.

Reviewer brought data into Global Mapper. Reviewer checked areas where original errors occurred. All errors were corrected. Review created shapefiles of areas where corrections were done. These have been included on the external hard drive in the Metadata folder.

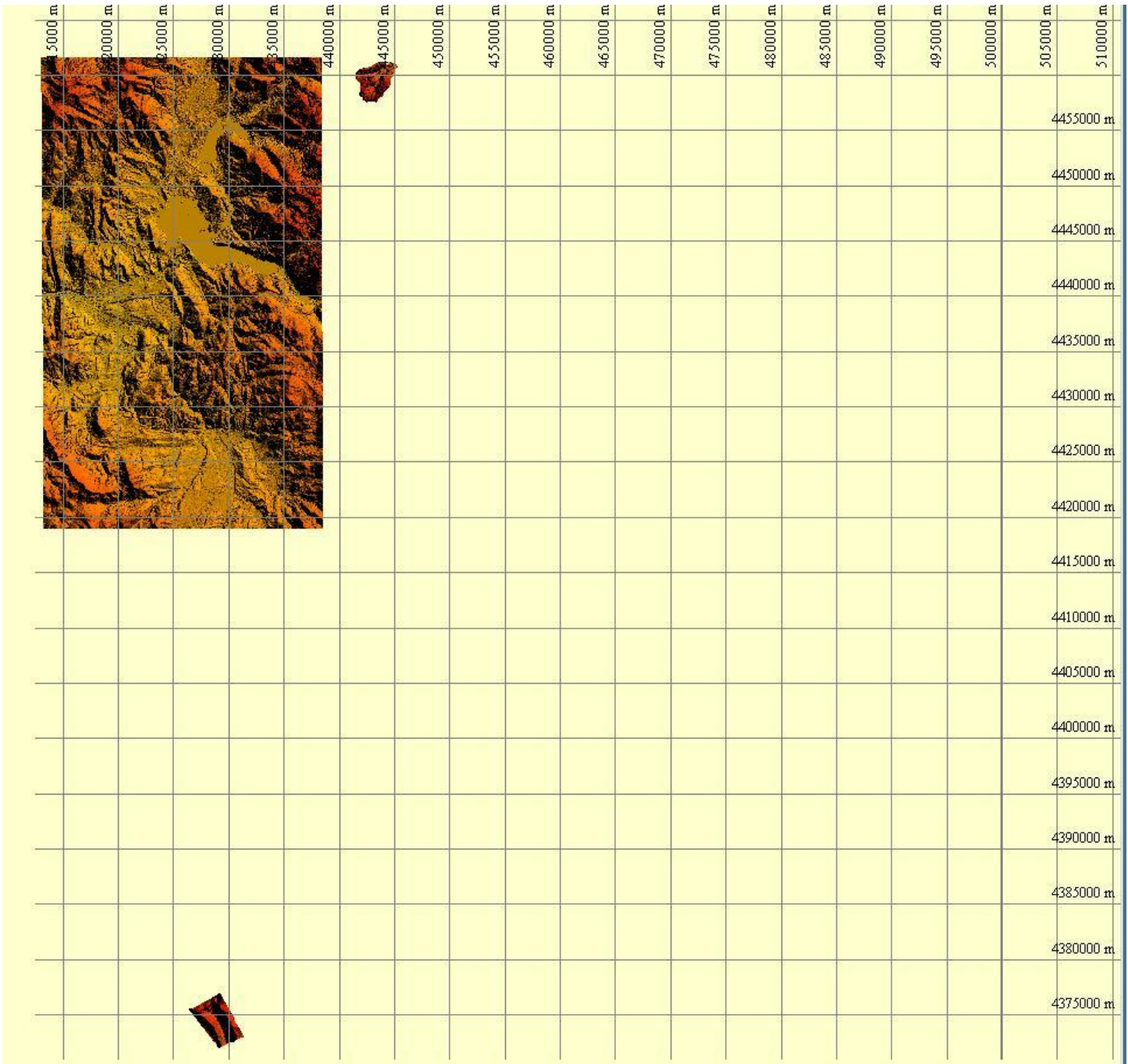
This data is accepted.

**Please see JPEG Examples below:**

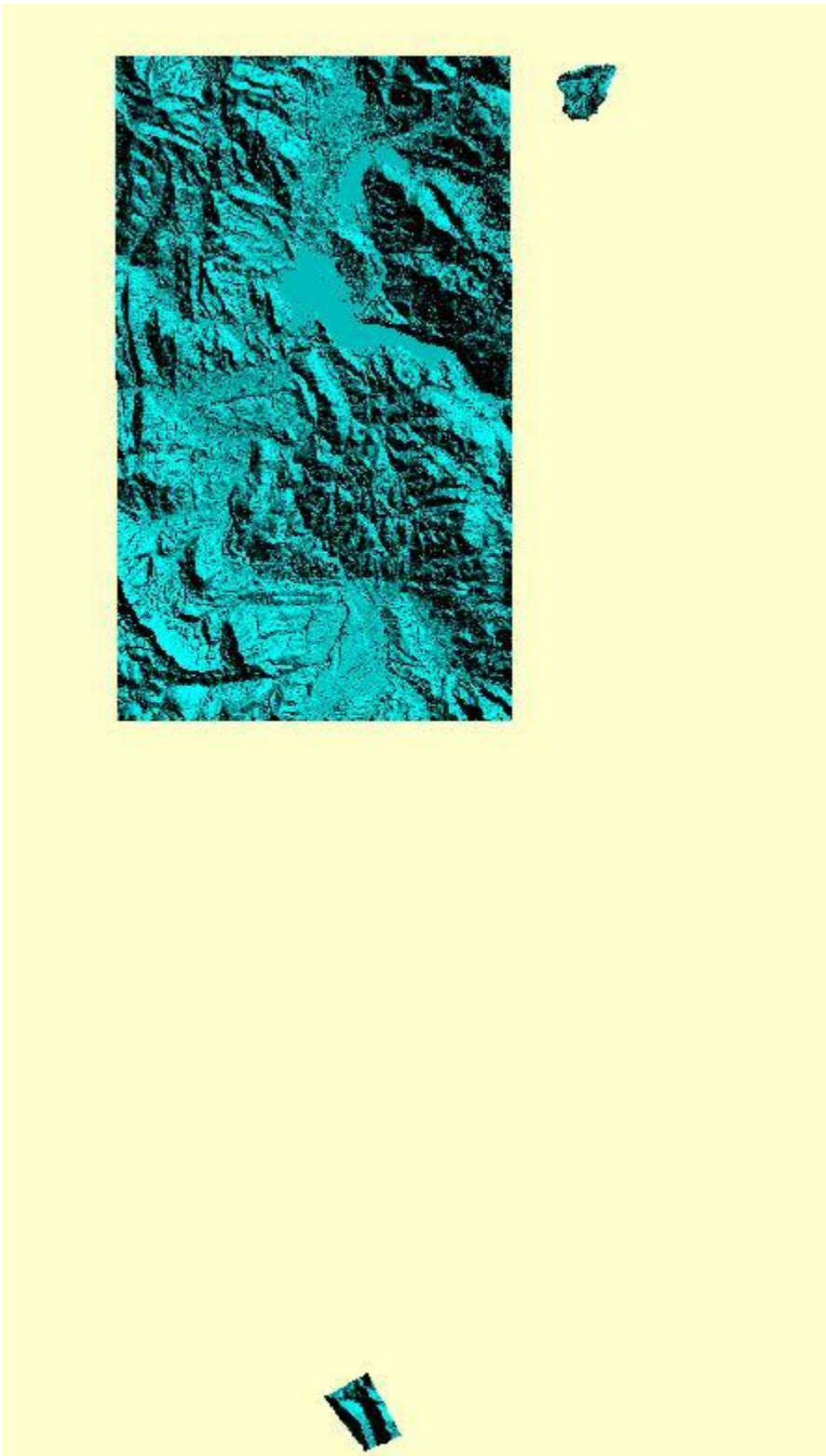
## Original Project Area



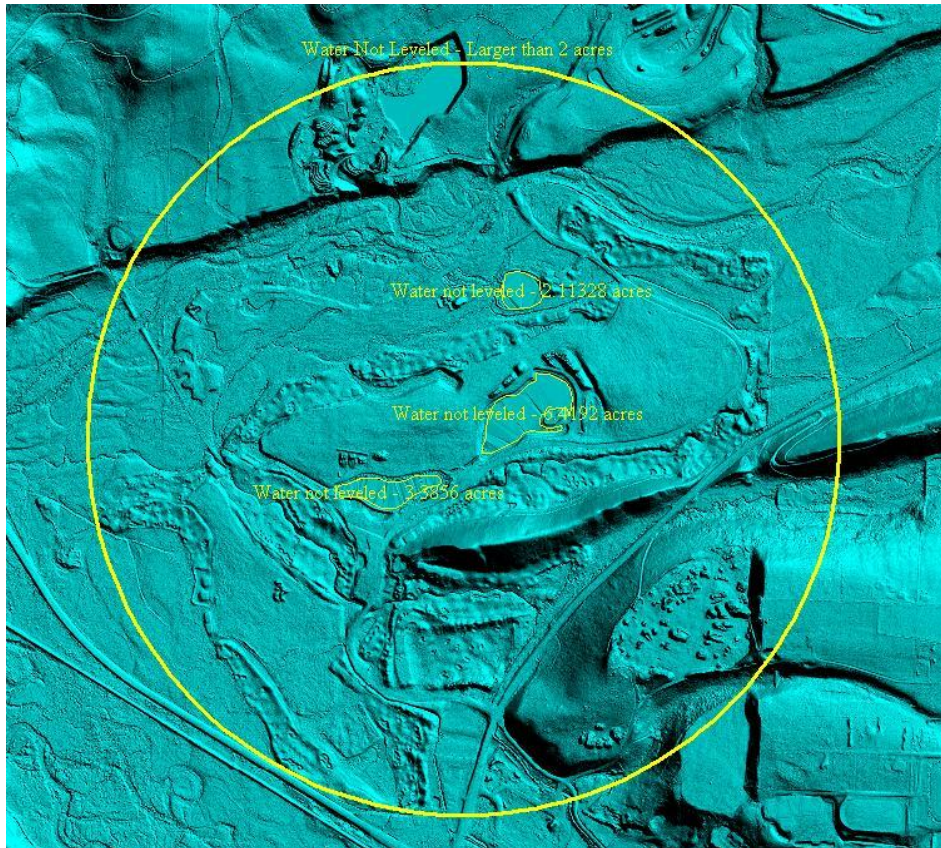
# CO Grand County Project Area 2



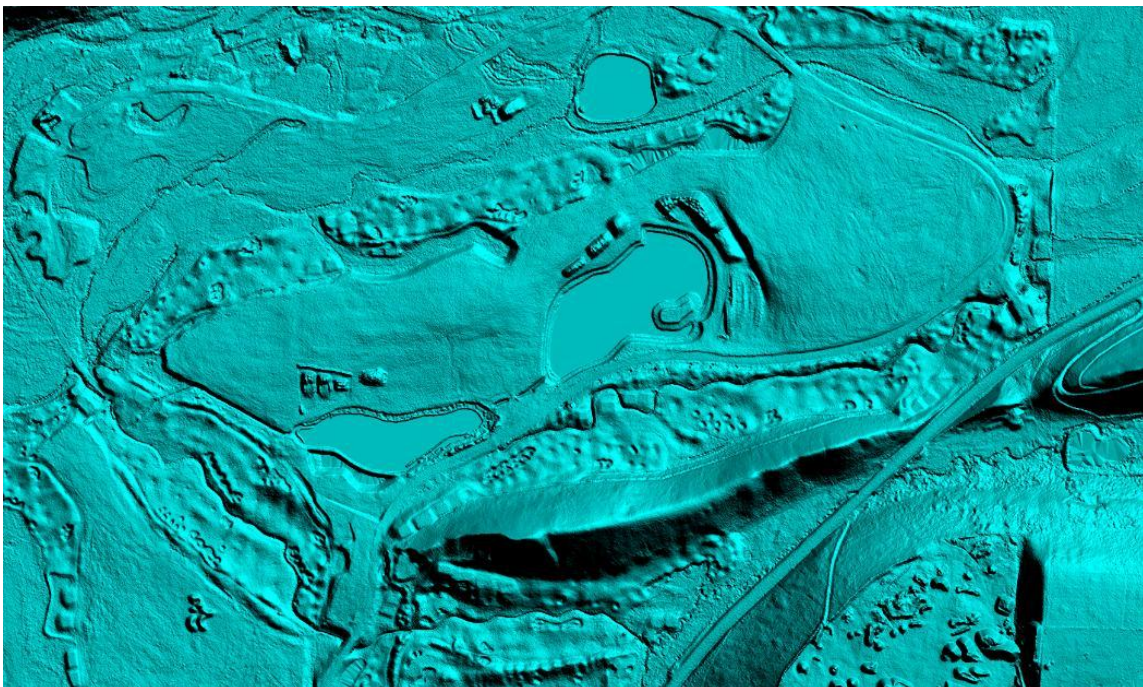
CO Grand County Correction 1: Corrected Projection of Tiles



## CO Grand County Correction 2: Water Levelled



A. Original .img file: Water not leveled

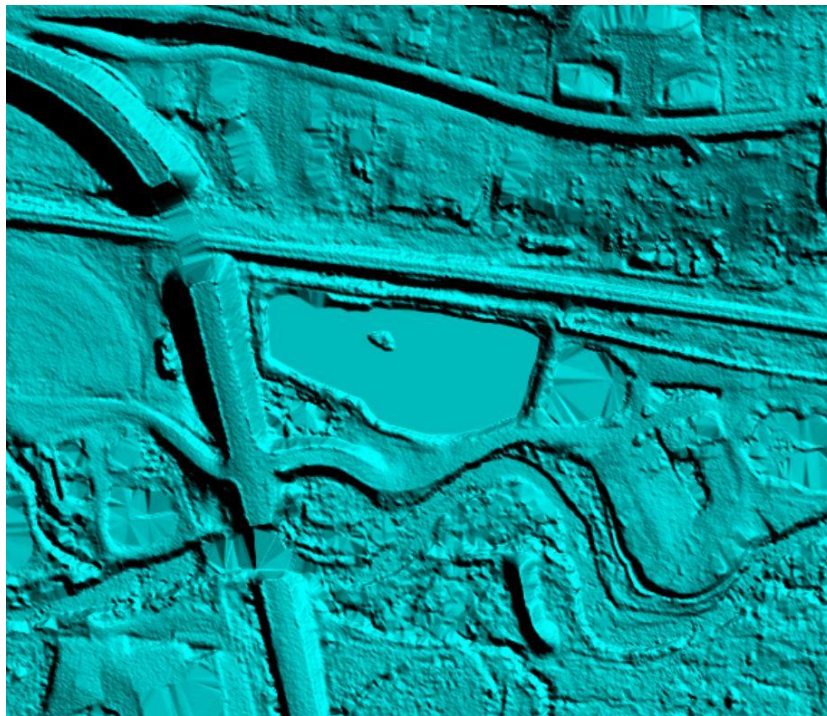


B. Corrected .img file: Water leveled

## CO Grand County Correction 3: Water Levelled

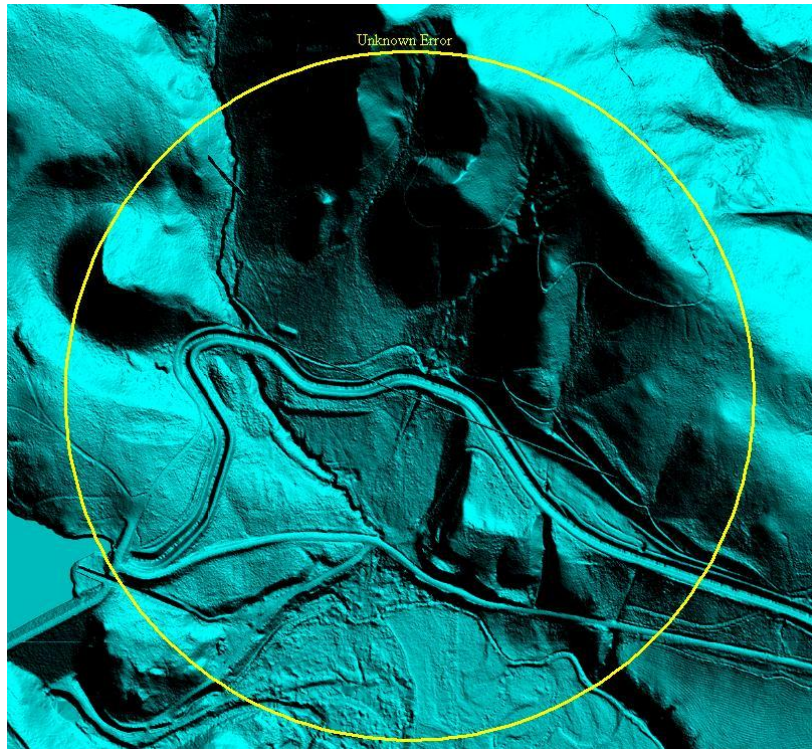


A. Original .img file: Water not leveled

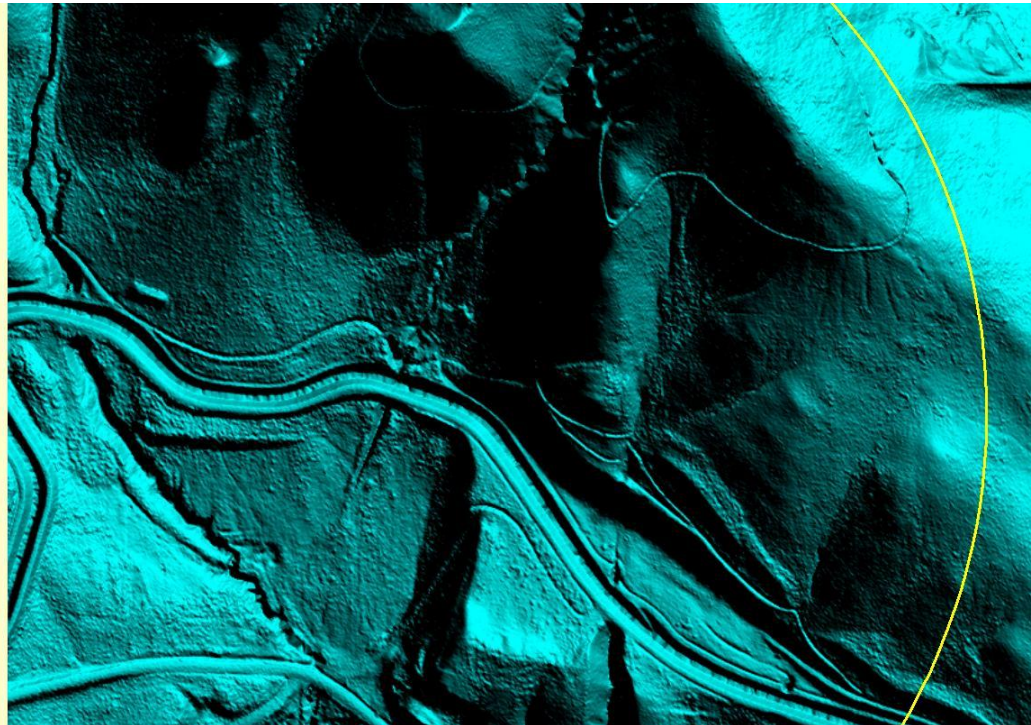


B. Corrected .img file: Water leveled

## CO Grand County Correction 4: Unknown Error Fixed

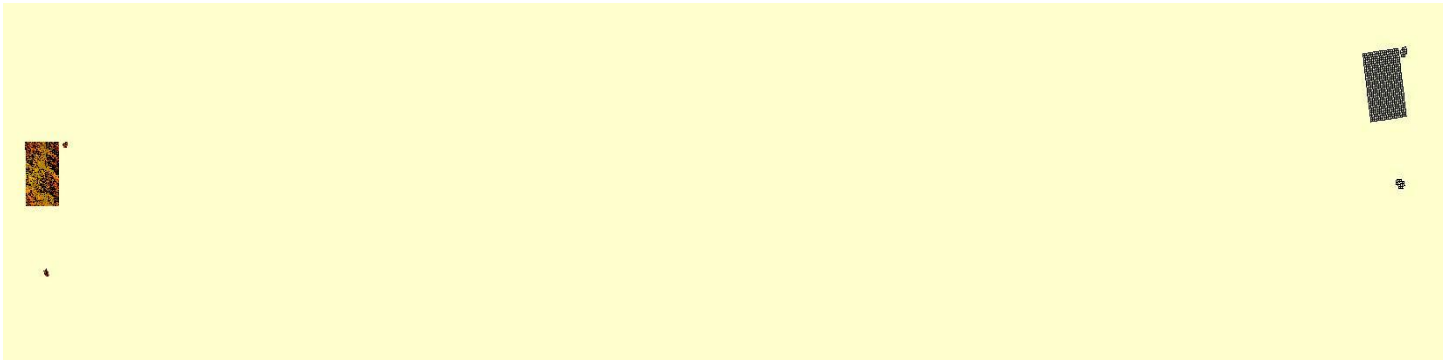


A. Original .img file: unknown error

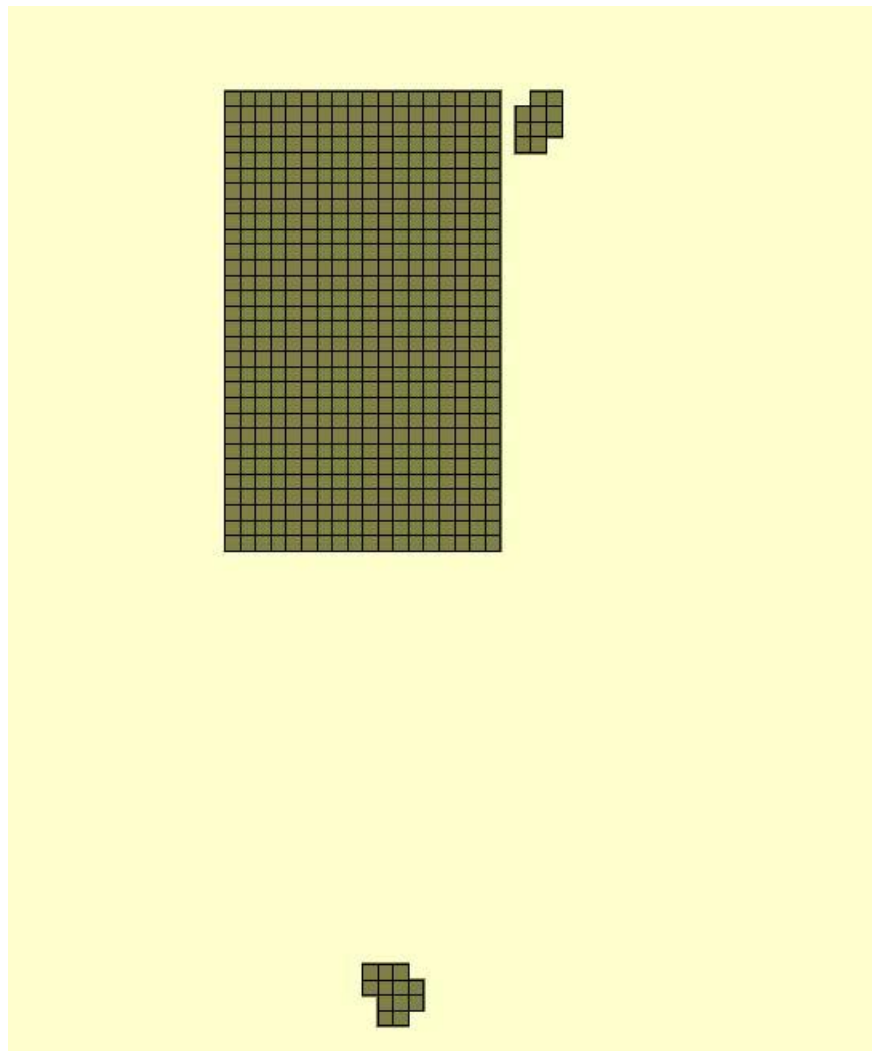


B. Corrected .img file: Unknown error removed

# CO Grand County Correction 5: Tile Layout Shapefile Projection Fixed



A. Original Layout Shapefile: UTM NAD 1983 Zone 15 projection



B. Original Layout Shapefile: UTM NAD 1983 Zone 13 projection