C-6.1 Report on Spatial Distribution and Regularity

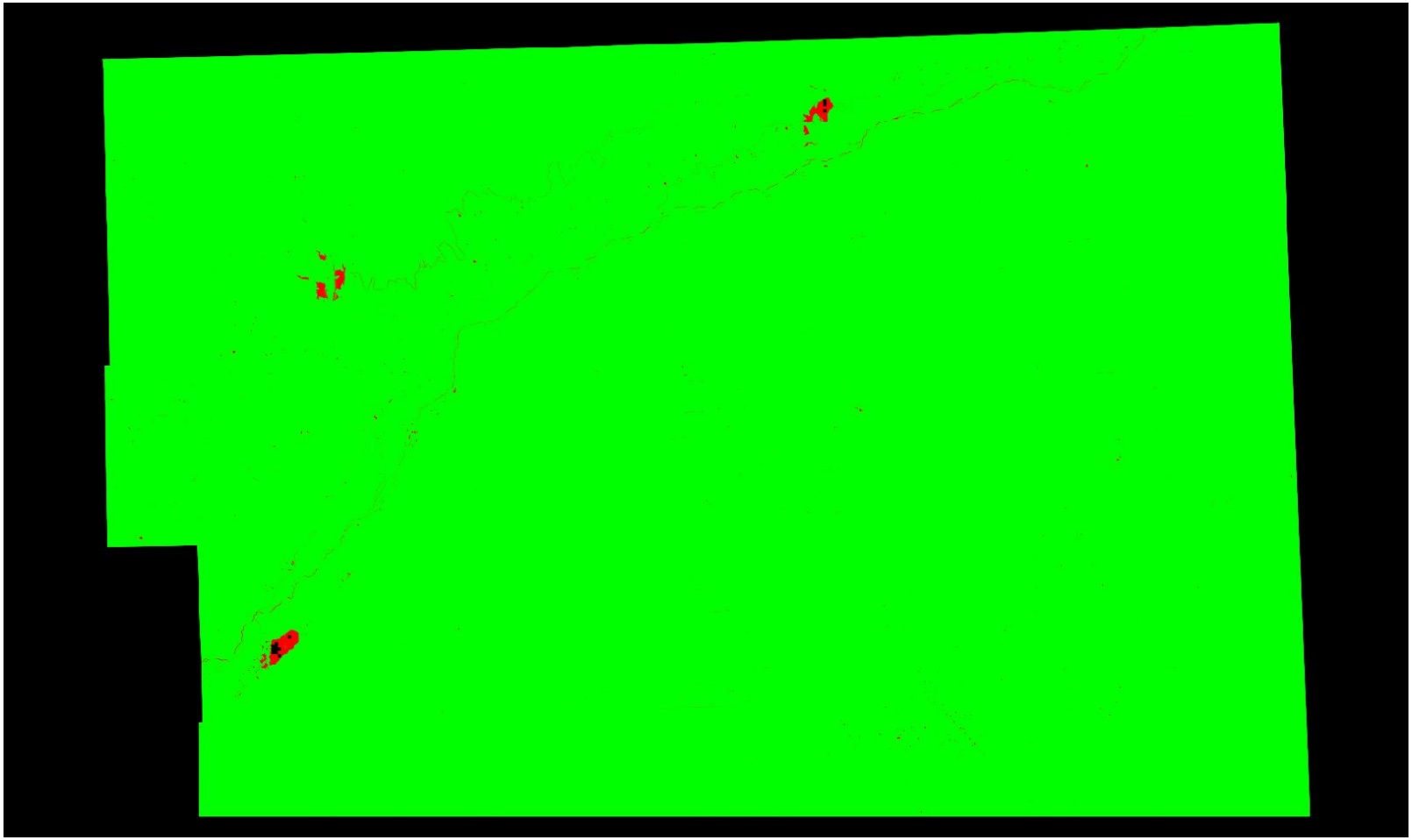
The USGS Lidar Base Specification Version 1.3 states: "The process described in this section relates only to regular and uniform point distribution. The process does not relate to, nor can it be used for, the assessment of NPS, ANPS, or data voids. The spatial distribution of geometrically usable points will be uniform and regular. Although lidar instruments do not produce a regular grid of points, collections will be planned and executed to produce an aggregate first return point data that approaches a uniform, regular lattice of points, rather than a collection of widely spaced, high-density profiles of the terrain. The regularity of the point pattern and density throughout the dataset is important and will be assessed by using the following method:
(1) Assess only nonwithheld, first return points of a single File Source ID.
(2) Exclude acceptable data voids previously identified in this specification.
(3) Generate a density raster from the data with a cell size equal to twice the design ANPS.
(4) Populate the raster using a count of points within each cell.
(5) Ensure that at least 90 percent of the cells in the grid contain at least one lidar point.
The USGS–NGP may allow lower passing thresholds for this requirement in areas of substantial relief where maintaining a regular and uniform point distribution is impractical."

The purpose of this section is to show graphically where unacceptable lidar spatial distributions are located. Lidar spatial distribution can be affected by problems in flight planning (e.g., incorrect scan frequency / pulse rate pairing) or flight execution (e.g., strong headwinds or tailwinds), a lack of coverage at the time of collection, water bodies not reflecting the laser beam back to the receiver, lidar occlusions caused by objects above ground like tall buildings, etc. Not all lidar spatial distribution violations are truly problematic. The intention of this test is to isolate the first example of lidar spatial distribution violations - problems in flight planning or flight execution. A close inspection must be done on the results to determine if the lidar spatial distribution was collected and processed to meet the intended specifications.

Data Source - Y:\Mapping\Projects\65220329_CWCB_FEMA\Production\Final_Client_Deliverables\Del4\point_cloud\Swaths

Result Path - Y:\Mapping\Projects\65220329_CWCB_FEMA\Admin\QA_QC\DEL4_QC\C_6\SpatialDistribution_SingleFile.jp2

C-6.1 Report on Spatial Distribution and Regularity - continued



Cell size: 4.659 US Survey Feet

Green: Cells containing at least one first return lidar point (number of cells = 5,246,903,817)
Red: Cells not containing at least one first return lidar point (number of cells = 13,010,185)
Background Color: Null data

Percentage of cells in the grid that contain at least one first return lidar point = 99.75% (Requirement is typically 90%)
See JPG2000 file for full resolution results