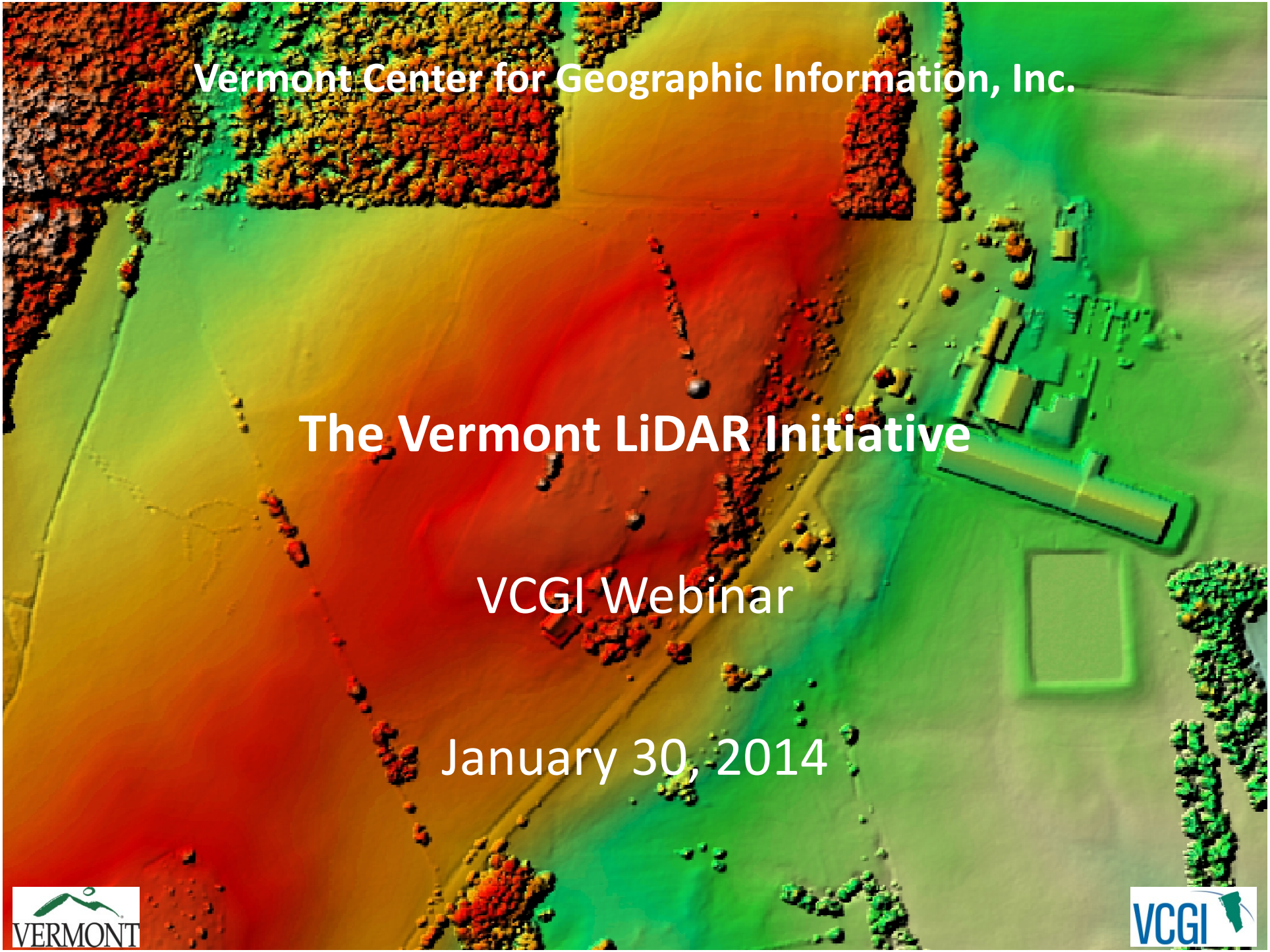
Vermont Center for Geographic Information, Inc.
The Vermont LiDAR Initiative
VCGI Webinar
January 30, 2014
VERMONT
VCGI

Introduction

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802.882.3008

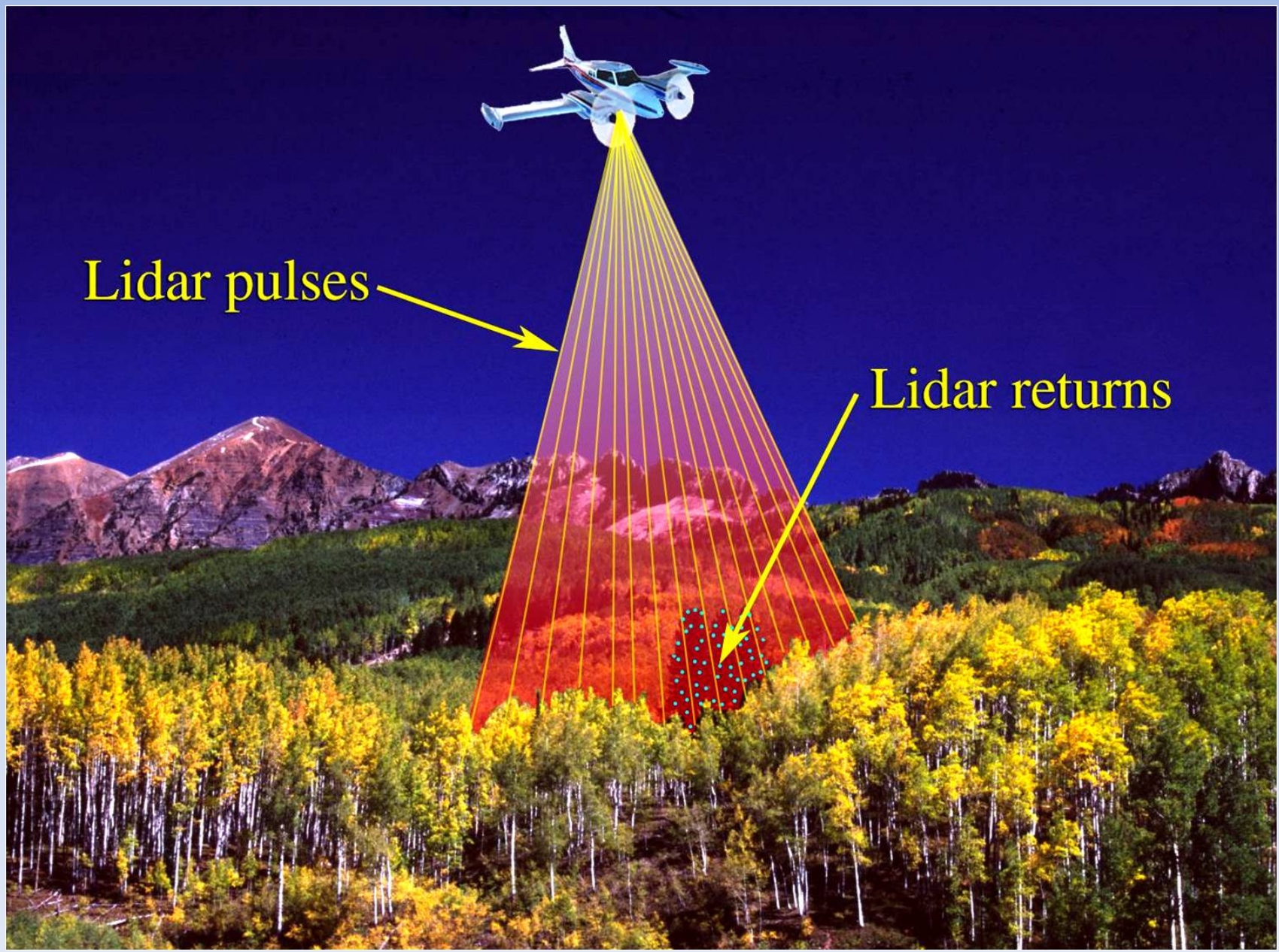
- The Vermont LiDAR Initiative (vcgi.vermont.gov/lidar)
  - The Plan: VT State LiDAR Plan
  - The People: The EGC's LiDAR Workgroup (~ "VTeam LiDAR")
  - The Need: VT LiDAR Initiative: Critical Infrastructure brochure

- The Enterprise GIS Consortium (EGC) is a voluntary consortium of state government organizations focused on effective management of the State's Enterprise GIS.

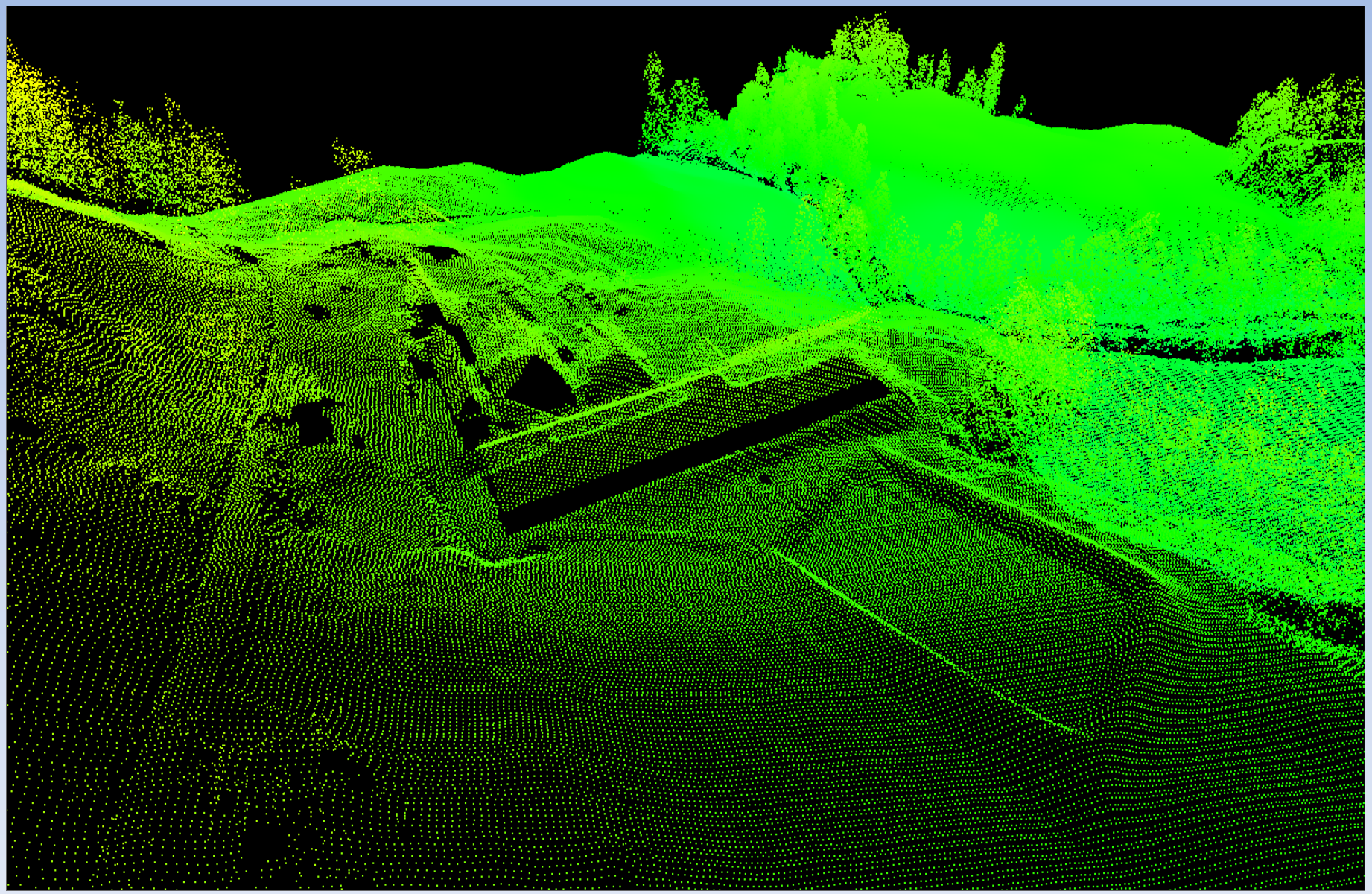
- National Digital Elevation Program (NDEP) – 12 Federal Agencies

- **VTeam LiDAR:** U.S. Geological Survey, National Resource Conservation Service, UVM Spatial Analysis Lab, VT Assoc. of Planning & Dev. Agencies, VCGI, VT Agency of Natural Resources, Lk Champlain Basin Program, U.S. Forest Service, VT Electric Coop, VT Sustainable Jobs Fund and the VT Geological Survey.

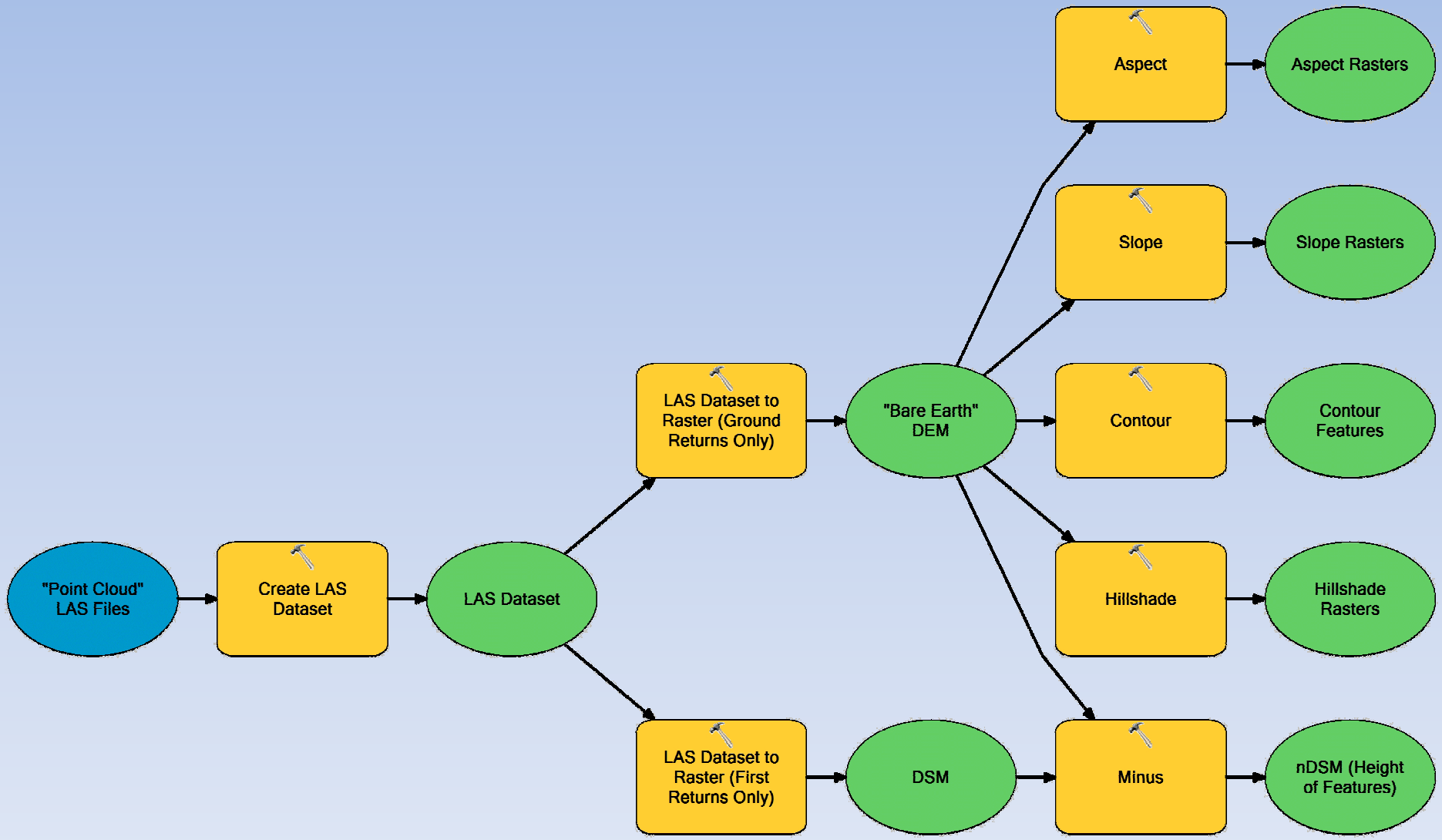
What is LiDAR?

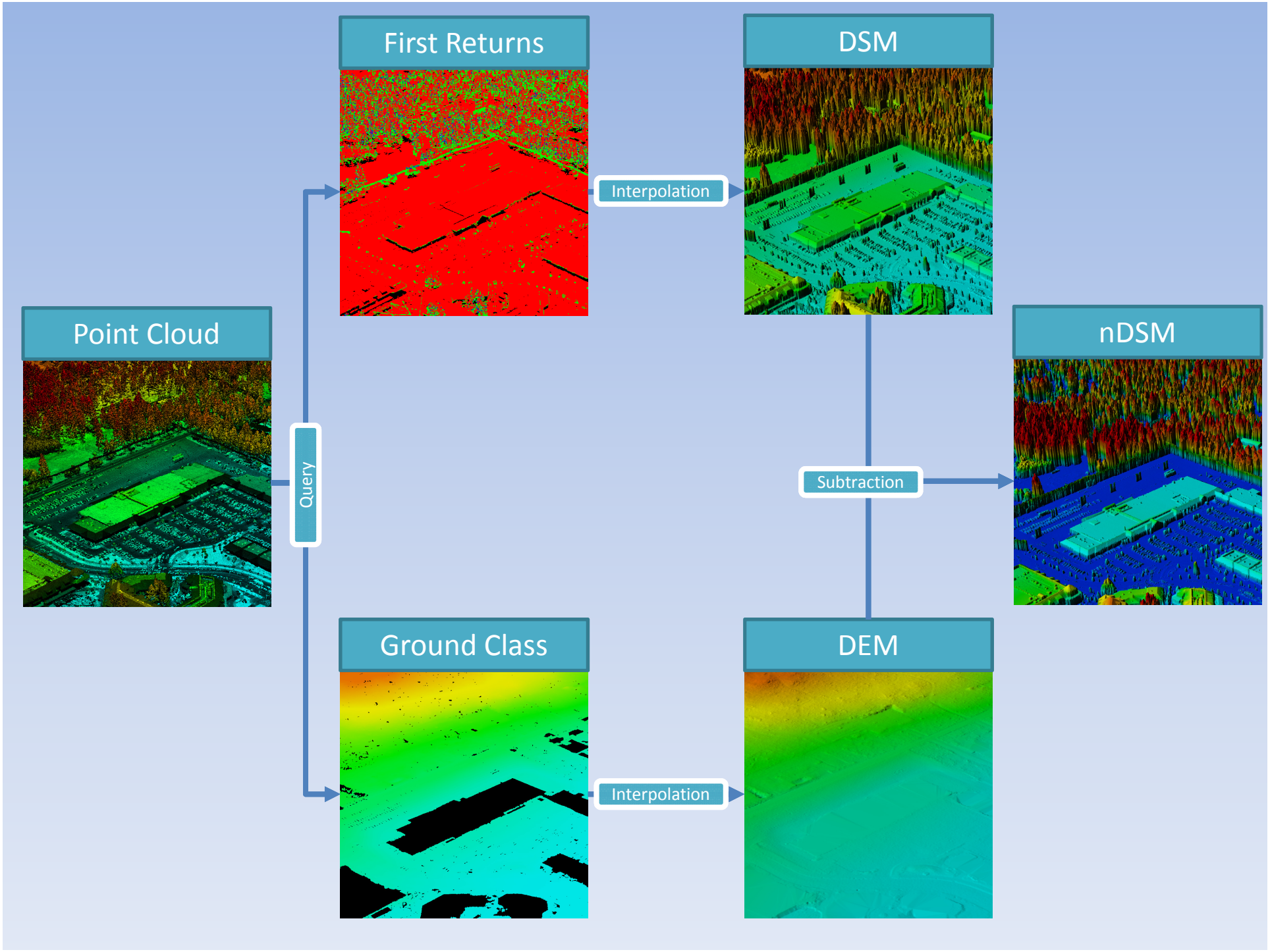


Primary LiDAR “Point Cloud” Deliverable

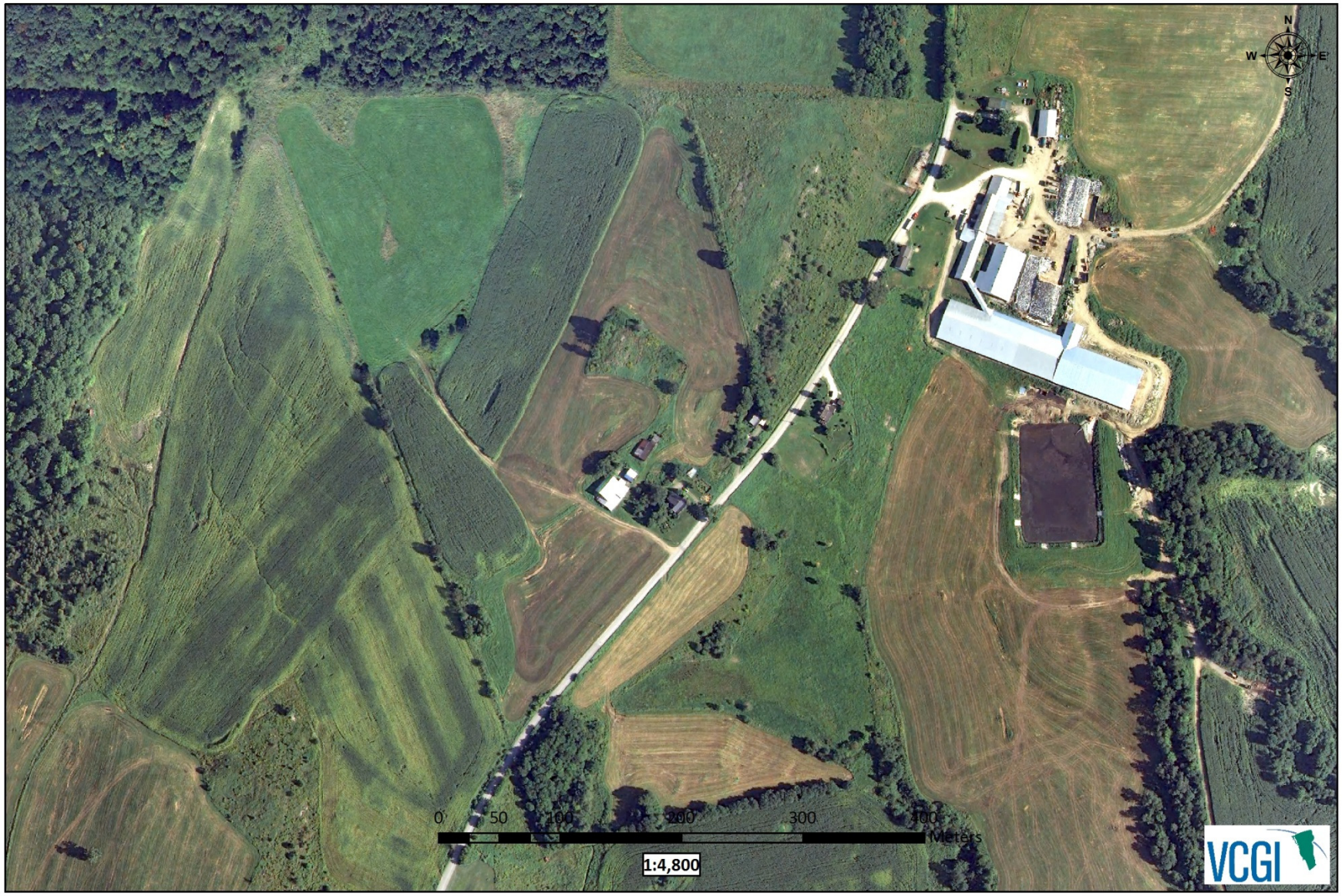


LiDAR Infographic

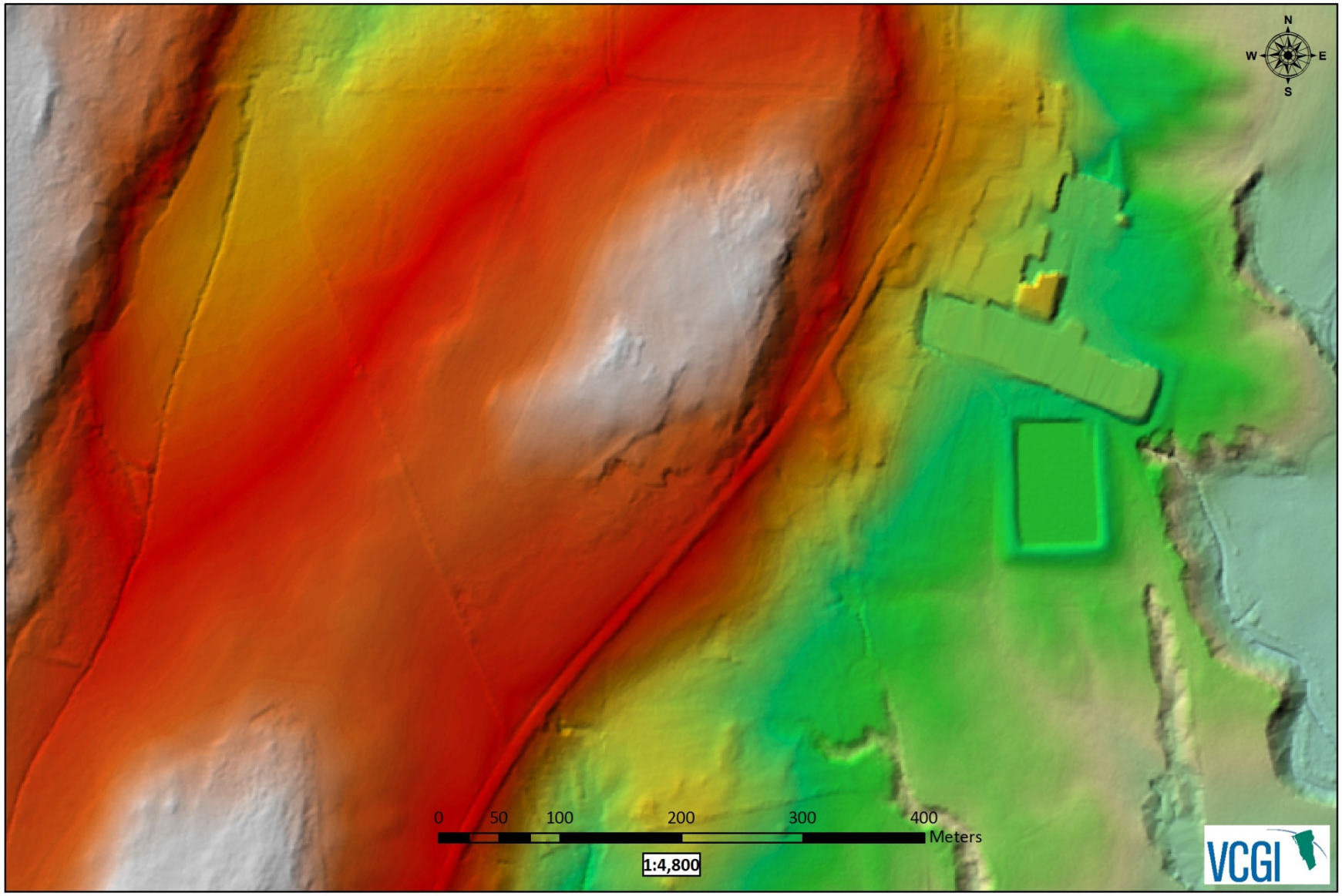



First Returns
DSM
Point Cloud
nDSM
Interpolation
Query
Subtraction
Ground Class
DEM
Interpolation

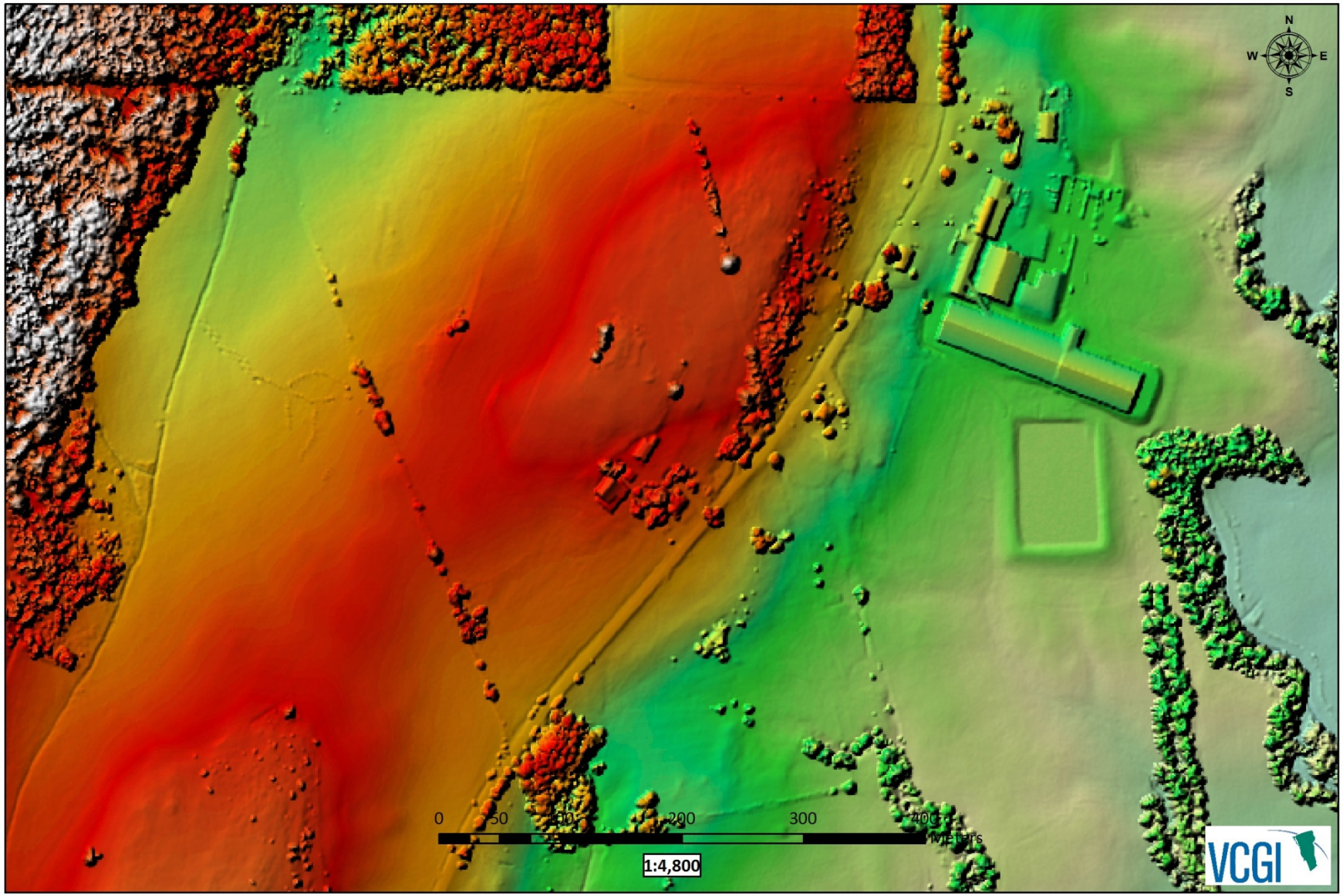
Demo Extent – Richford, VT



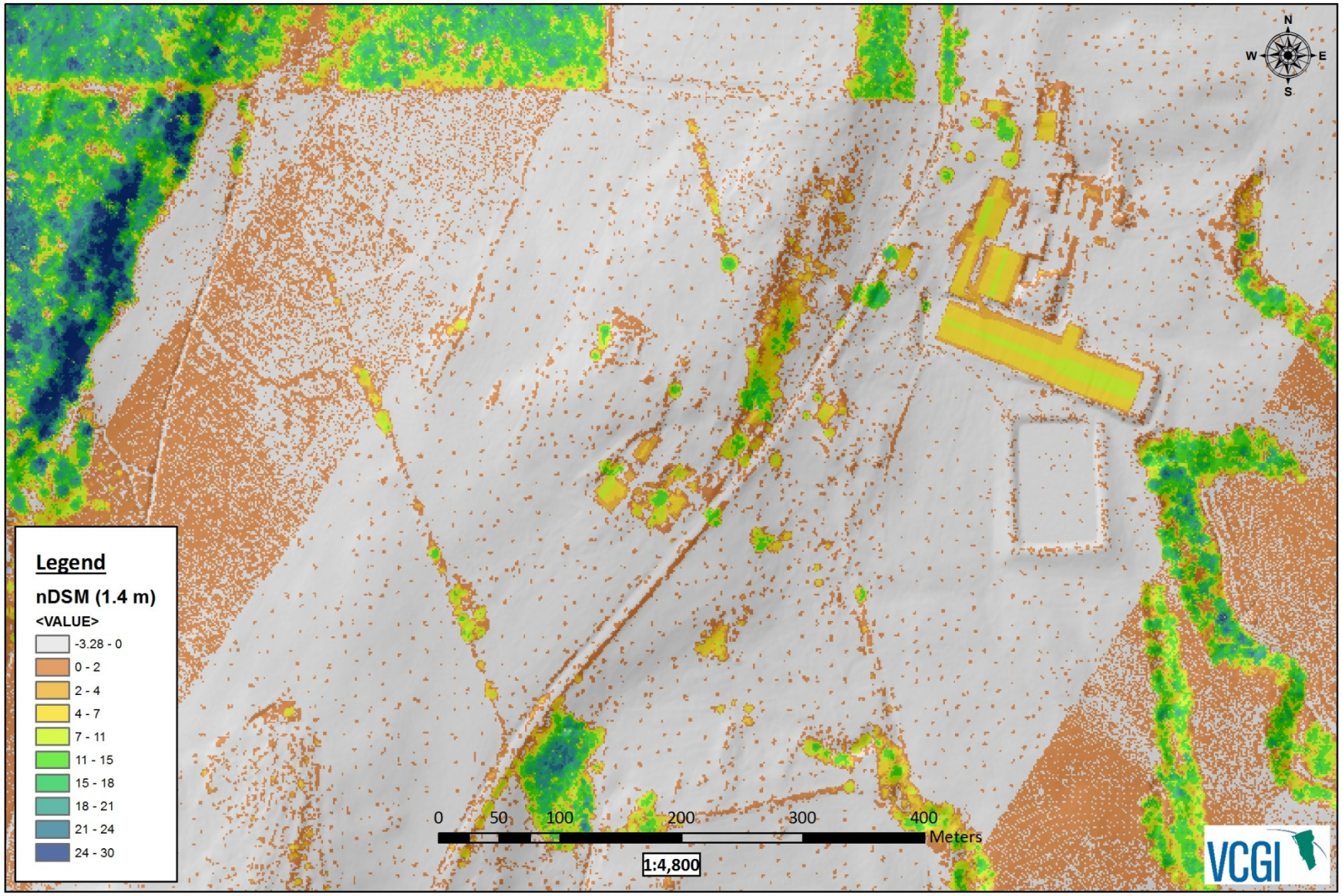
“Bare Earth” DEM



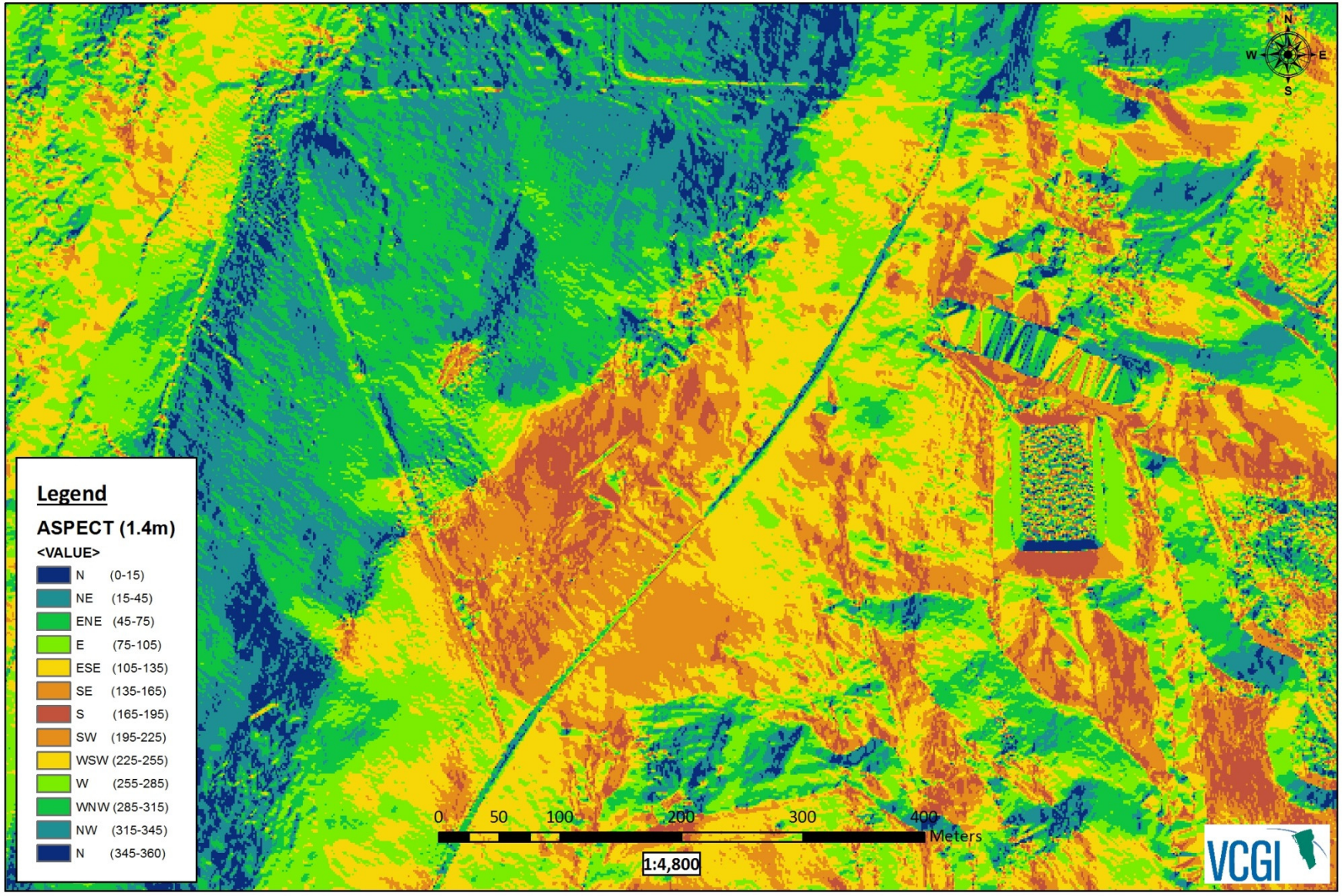
Digital Surface Model (DSM)



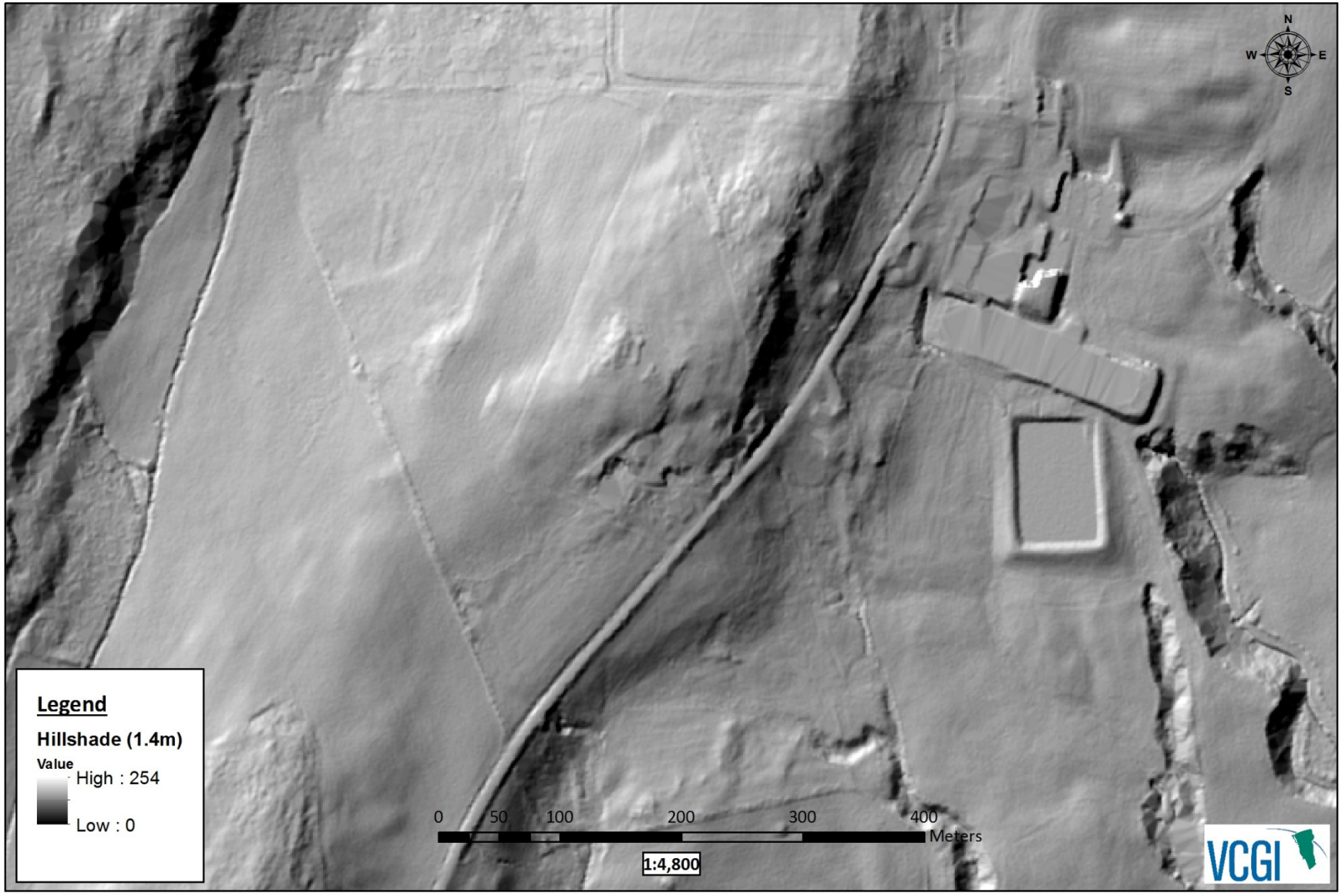
Normalized DSM (nDSM)



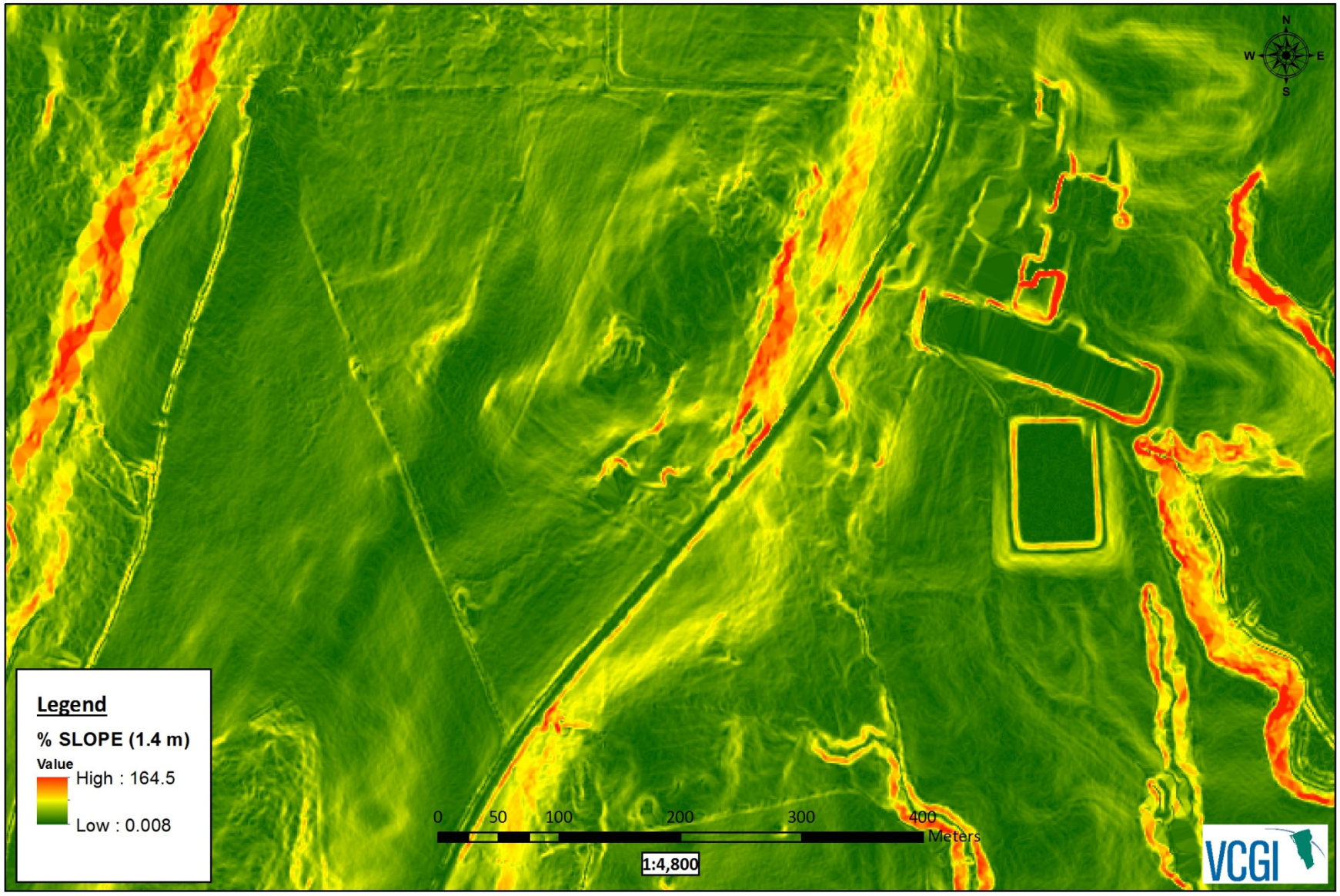
Aspect (Azimuth)



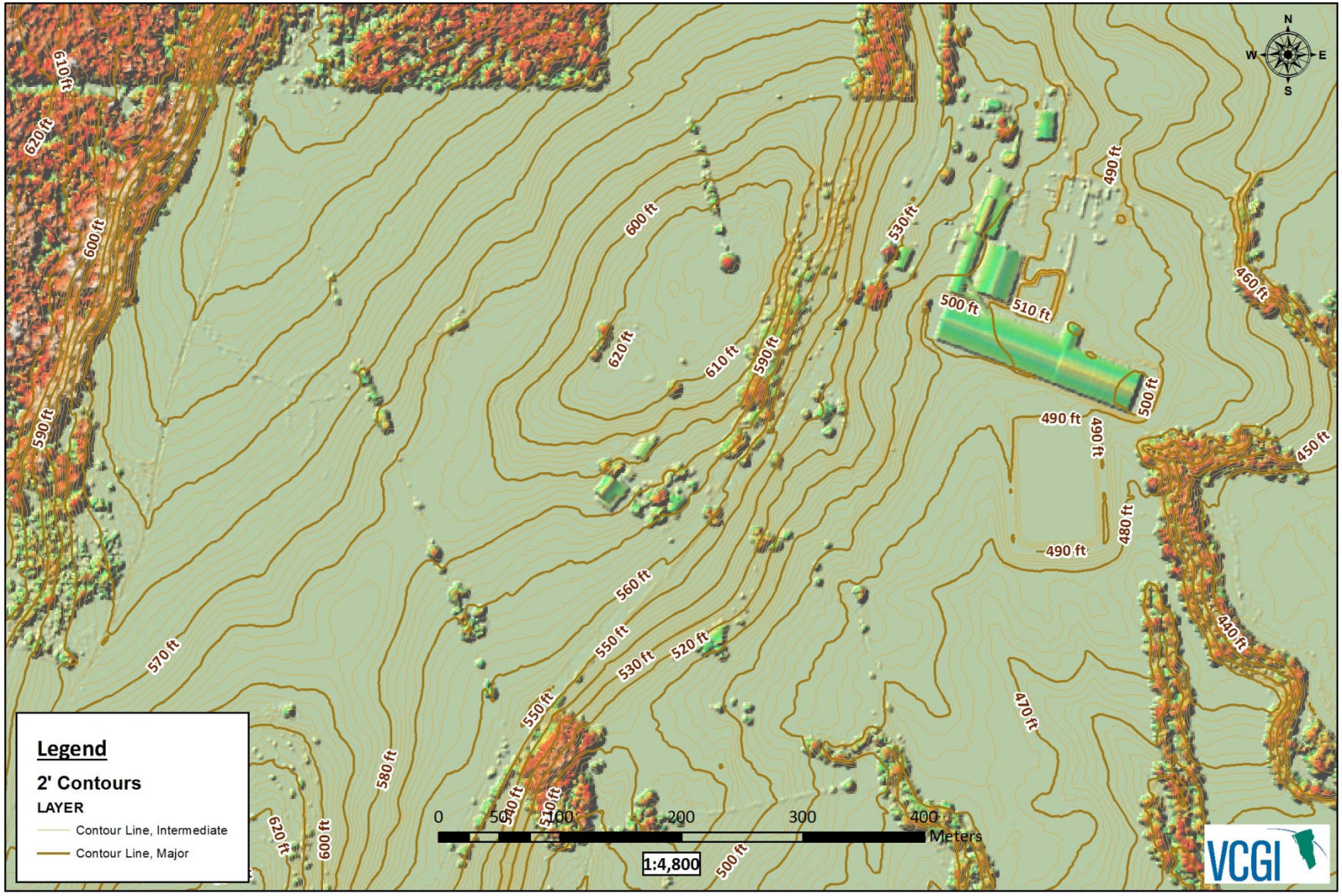
Hillshade


N
W
E
S
Legend
Hillshade (1.4m)
Value
High : 254
Low : 0
0
50
100
200
300
400
Meters
1:4,800
VCGI

Slope

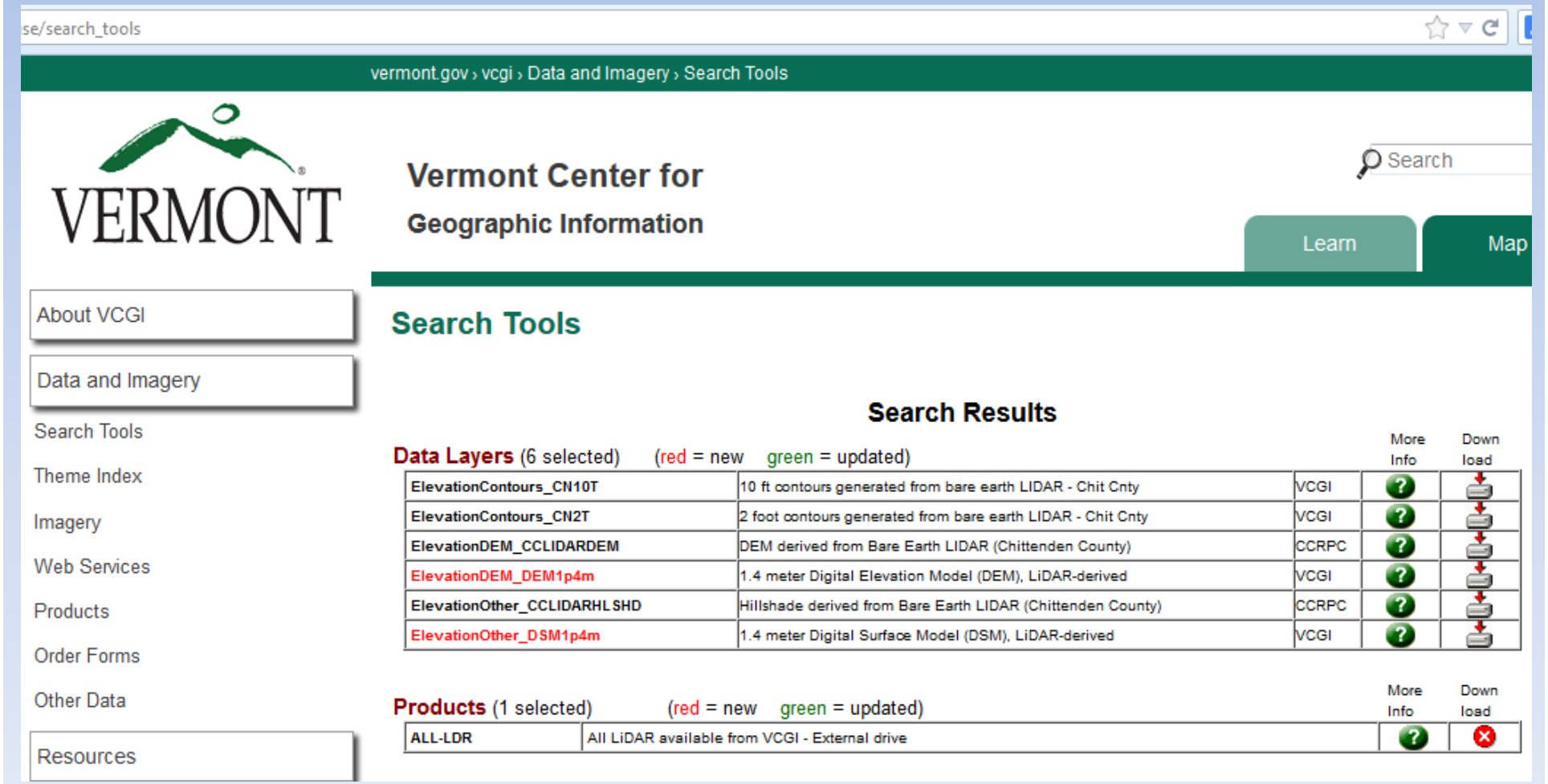

N
W
E
S
Legend
% SLOPE (1.4 m)
Value
High : 164.5
Low : 0.008
0
50
100
200
300
400
Meters
1:4,800
VCGI

Contours (2’)


N
W
E
S
610 ft
620 ft
600 ft
590 ft
570 ft
580 ft
560 ft
550 ft
530 ft
520 ft
540 ft
510 ft
500 ft
490 ft
480 ft
470 ft
460 ft
450 ft
440 ft
Legend
2' Contours
LAYER
Contour Line, Intermediate
Contour Line, Major
0
50
100
200
300
400
Meters
1:4,800
VCGI

Accessing Available Data

- VGIS Download - Processed derivatives (“bare earth” DEM, DSM, contours etc…)
- VCGI ALL-LDR Product – Includes downloads, pending derivatives, LAS files and vendor data
- VGIS Services – Stream of Feature/Image Services (under development)
- Vendor LAS files – Earth Explorer Option (now) NOAA Coastal Services Center (~2014)
- Open Topography – UCSD/SDSC & ASU – National Science Foundation supported



NDEP Quality Levels (QLs)

Quality Levels	Data Source	Horizontal Resolution	Vertical Accuracy	
		Point Density	RMSEz in Open Terrain	Equivalent Contour Accuracy
QL 1	LiDAR	**8 points/m^2**	**9.25 cm**	1 foot
QL 2	LiDAR	**2 points/m^2**	**9.25 cm**	1 foot
QL 3	LiDAR	**1 – 0.25 points/m^2**	**≤18.5 cm**	2 feet
QL 4	Imagery/ LiDAR	**1 – 0.04 points/m^2**	**46.3 – 139 cm**	5 – 15 feet
QL 5	Imagery/ IFSAR	**0.04 points/m^2**	**92.7 – 185 cm**	10 – 20 feet

- Bathymetric LiDAR requirements assessed for three Quality Levels to include Low, Standard and High. Standard Quality Level (3-5 meter post spacing; RMSEz ~ 20 cm)
- Note – USGS LiDAR base acquisition specification version 13 is = QL3 data

ArcGIS Licensing Requirements

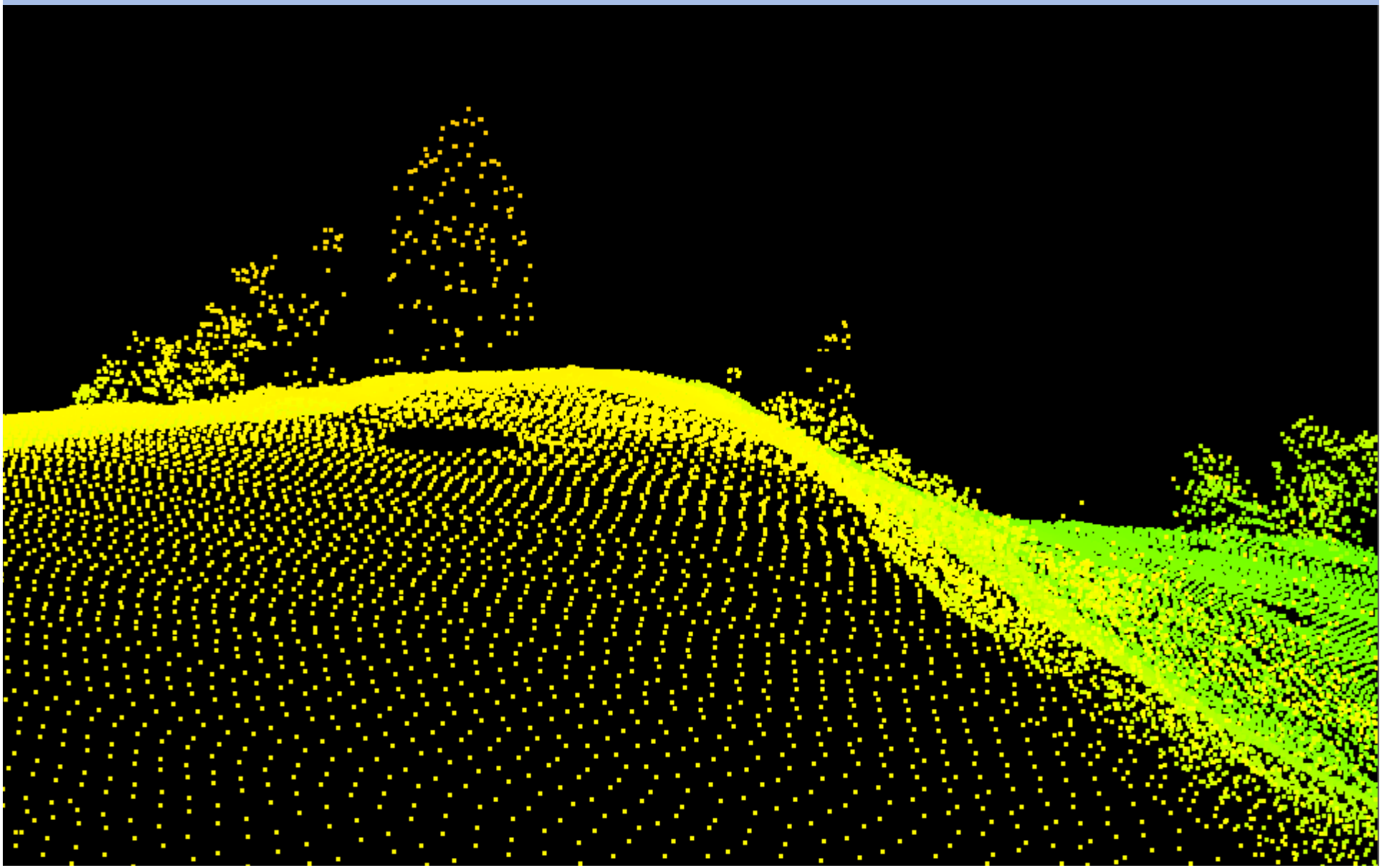
Functionality	ArcGIS Desktop >= Basic	ArcGIS Desktop >= Standard	3D Analyst ext.	Spatial Analyst ext.
Create LAS dataset		Yes	Yes	Yes
Create a mosaic dataset containing LAS data		Yes		Yes
Convert LAS into a multipoint feature class			Yes	
Create a terrain dataset			Yes	
View LAS data (via LAS dataset/mosaic dataset/terrain dataset)	Yes	Yes	Yes	Yes
Convert LAS to raster		Yes	Yes	Yes
Run TIN-based analysis against LAS (via LAS dataset)			Yes	
Run raster-based analysis against LAS (via mosaic dataset)	Yes	Yes	Yes	Yes
Run TIN-based analysis against LAS (via LAS dataset)			Yes	
Use the LAS dataset toolbar tools in ArcMap or ArcScene			Yes	
Editing LAS dataset schema (add or remove files)		Yes	Yes	Yes
Editing LAS class codes			Yes	
Editing mosaic datasets		Yes		
Editing terrain datasets			Yes	

Source: “Licensing requirements when working with lidar in ArcGIS“ - resources.arcgis.com

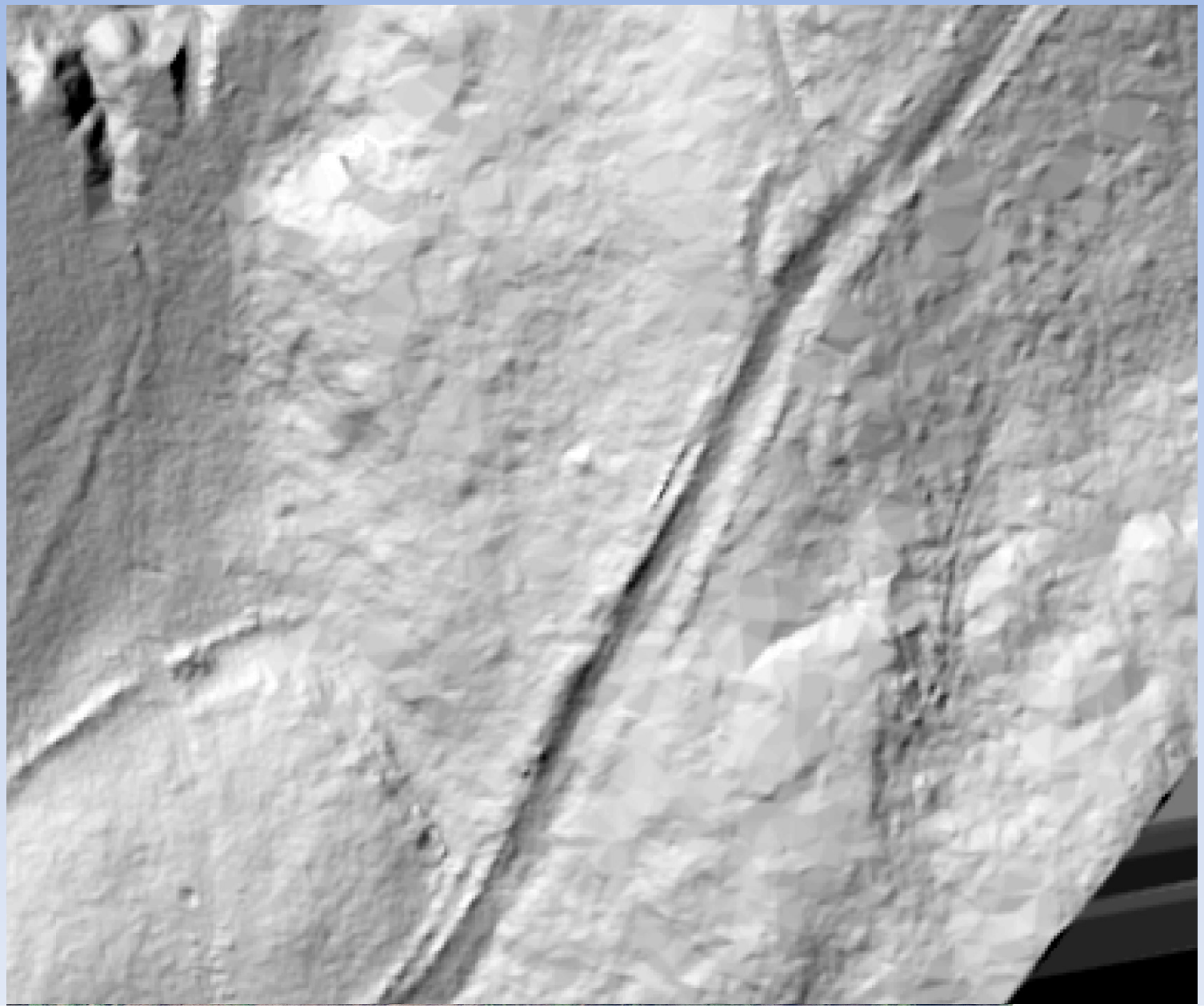
Resources

- **Esri help: Resources.arcgis.com:**
  - Geodata\DataTypes\LAS Dataseet\LiDAR support in ArcGIS & ~\LiDAR Solutions in ArcGIS
- **Other**
  - **Blog: Letters from the SAL** (Stream of LiDAR Consciousness) (http://letters-sal.blogspot.com/search/label/LiDAR)
  - **VT LiDAR Initiative** (vcgi.vermont.gov/lidar)
  - USGS Earth Explorer (Data – http://earthexplorer.usgs.gov/)
  - NOAA Digital Coast (Data, Tools, Training - http://csc.noaa.gov/digitalcoast/)
  - LiDAR News - http://www.lidarnews.com/
  - LiDAR Data Quality Levels (QLs) - Specifications for the varying "QLs".
  - "Hydro Treatments of LiDAR-Derived DEMs" - Options for Processing LiDAR (USGS)
  - Quick Terrain Modeler videos - (http://appliedimagery.com/tutorials).
- **Tools**
  - **ArcGIS Desktop -** Rendering: Via Windows\Image Analysis
  - LAS Tools, Quick Terrain Modeler, Global Mapper etc..

Gallery – Tree in the “point cloud”



Gallery – Ancient Road



Gallery – Historic Preservation

Wrap Up

Lightning Updates (Share your LiDAR related news)

- Advocacy /funding
- Applications (how are you/would you use it for?)
- Data development

Questions and Answers

- Questions for us?

Other?

Contact Info:

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Main URL – vcgi.vermont.gov
VT LiDAR Init. - vcgi.vermont.gov/lidar

…extra