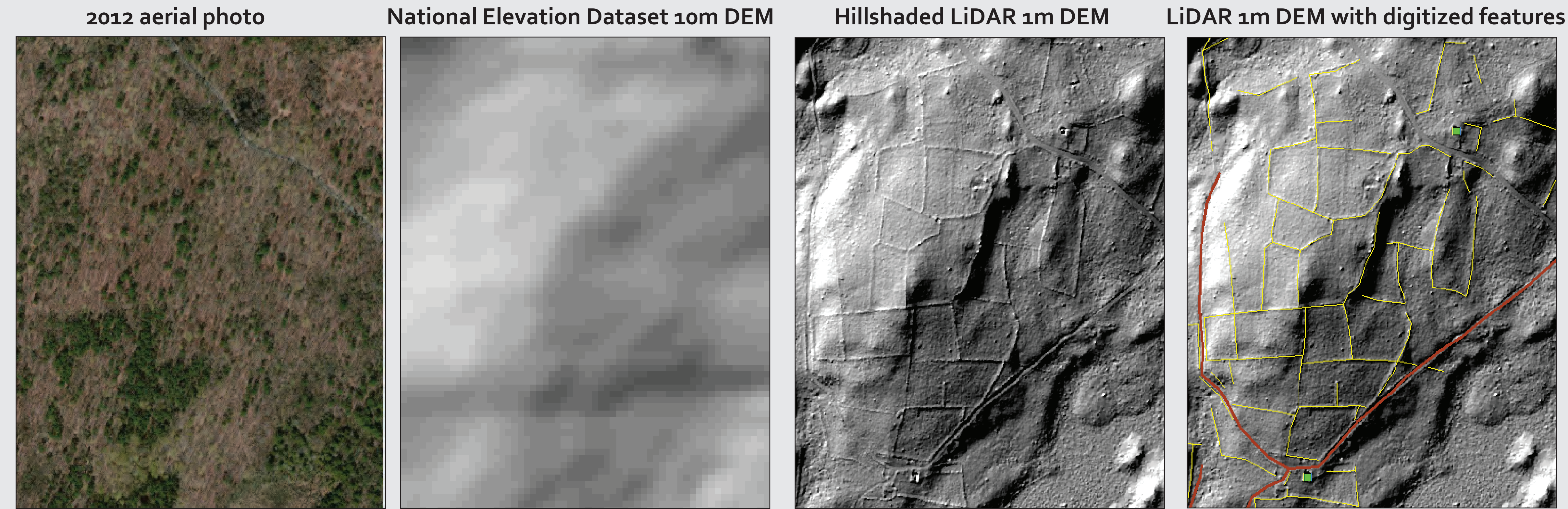


UNCOVERING THE PAST: GIS ANALYSIS OF ARCHAEOLOGICAL FEATURES UNDER NEW ENGLAND FORESTS USING HIGH RESOLUTION TOPOGRAPHIC DATA (LiDAR)

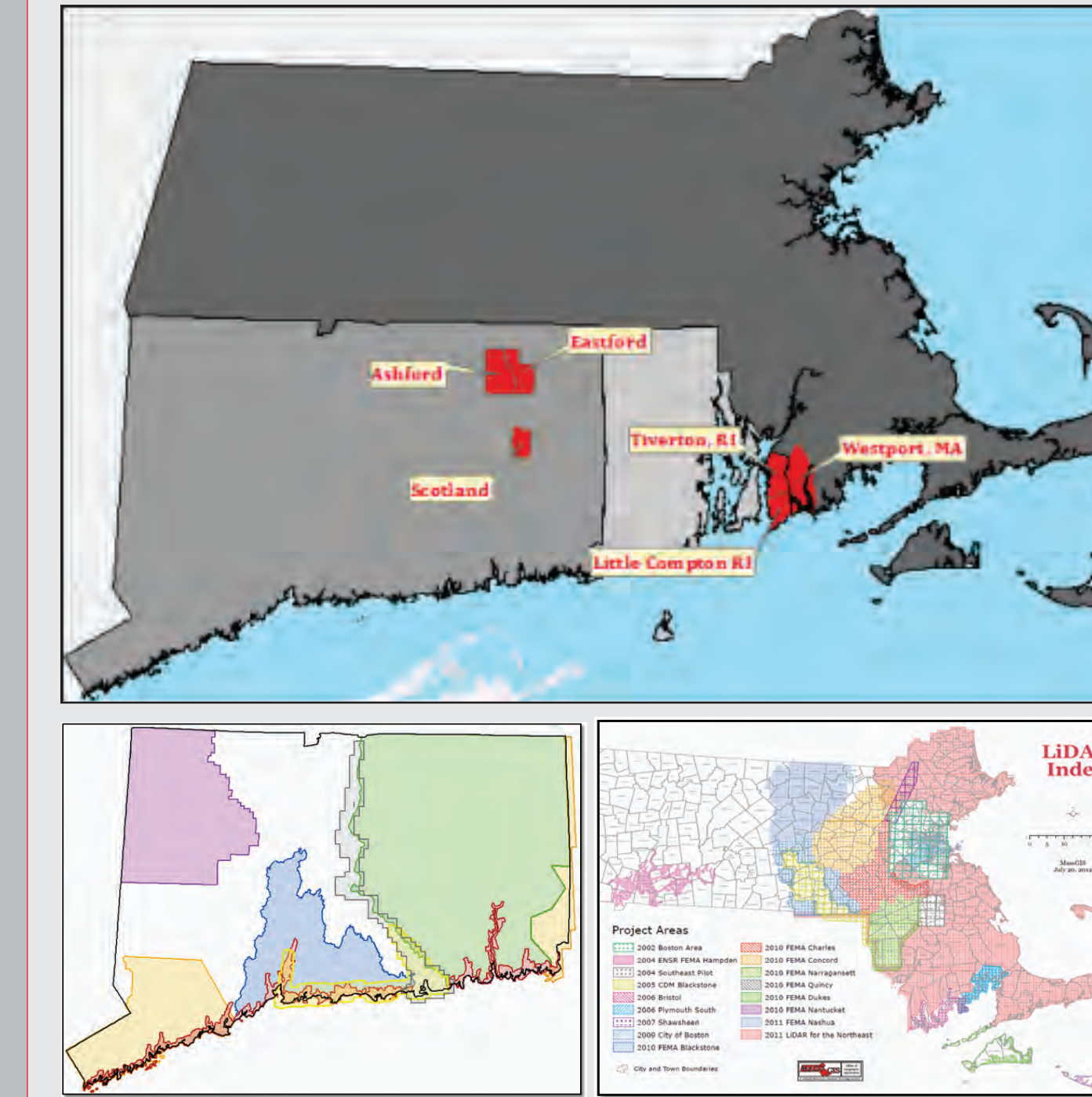
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ADVANTAGES OF LiDAR DATA



LiDAR data has a much higher resolution than other available topographic data. Additionally, it allows the user to see features below the dense forest canopy of New England, which is not possible using even the most recent and high resolution aerial imagery. This then makes it possible to discern archaeological landscape features such as stone walls, old roads, building foundations for houses, barns, mills or outbuildings, dams and other historical features. This emerging technology has implications for cultural resource management, planning, historic preservation, conservation, environmental science, as well as many other fields.

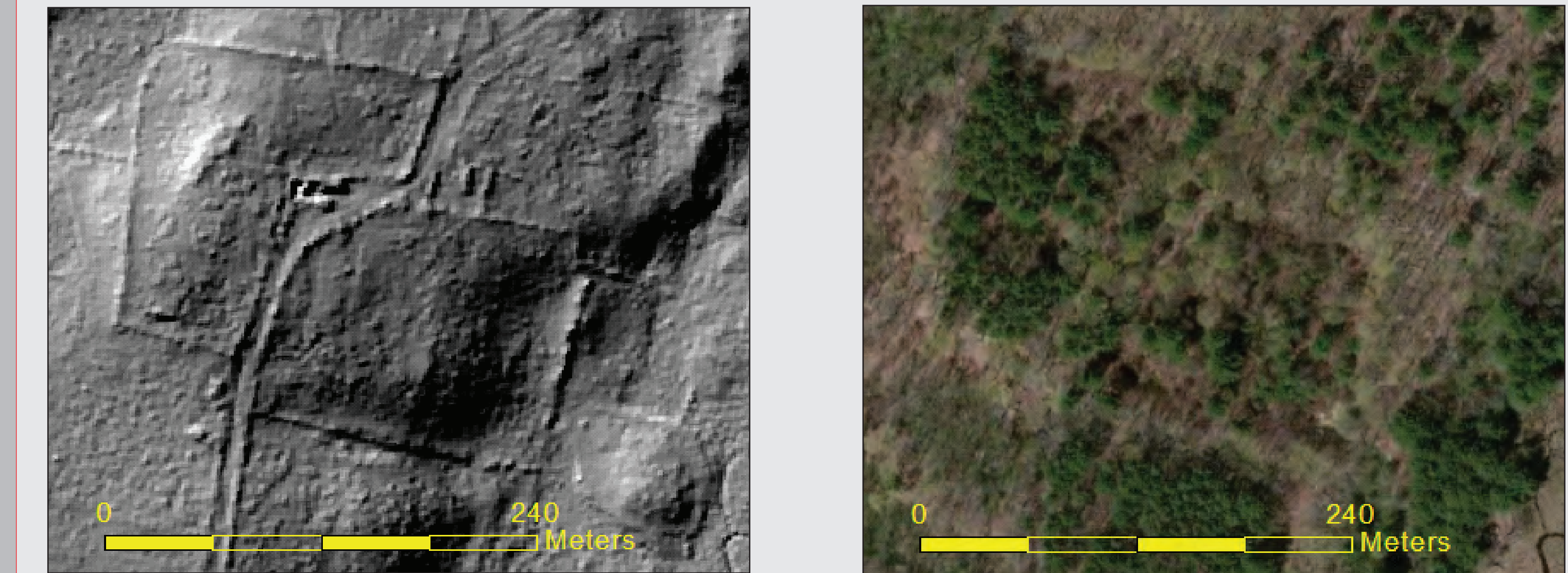
STUDY AREAS & LiDAR DATA AVAILABILITY



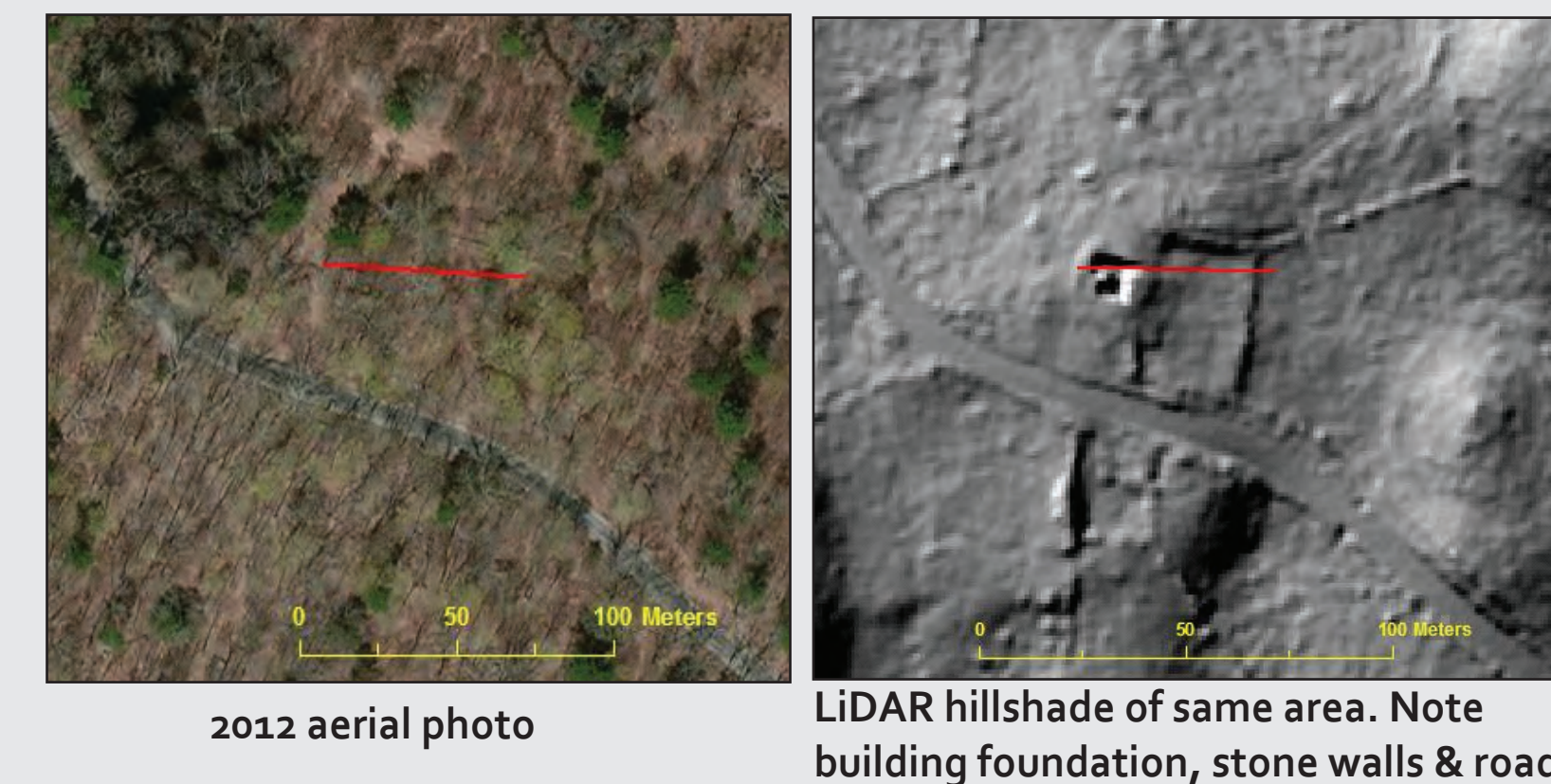
LiDAR is quickly becoming available in most areas of New England, and is usually made freely available by state or municipal GIS websites.

LiDAR DATA & HISTORICAL IMAGERY

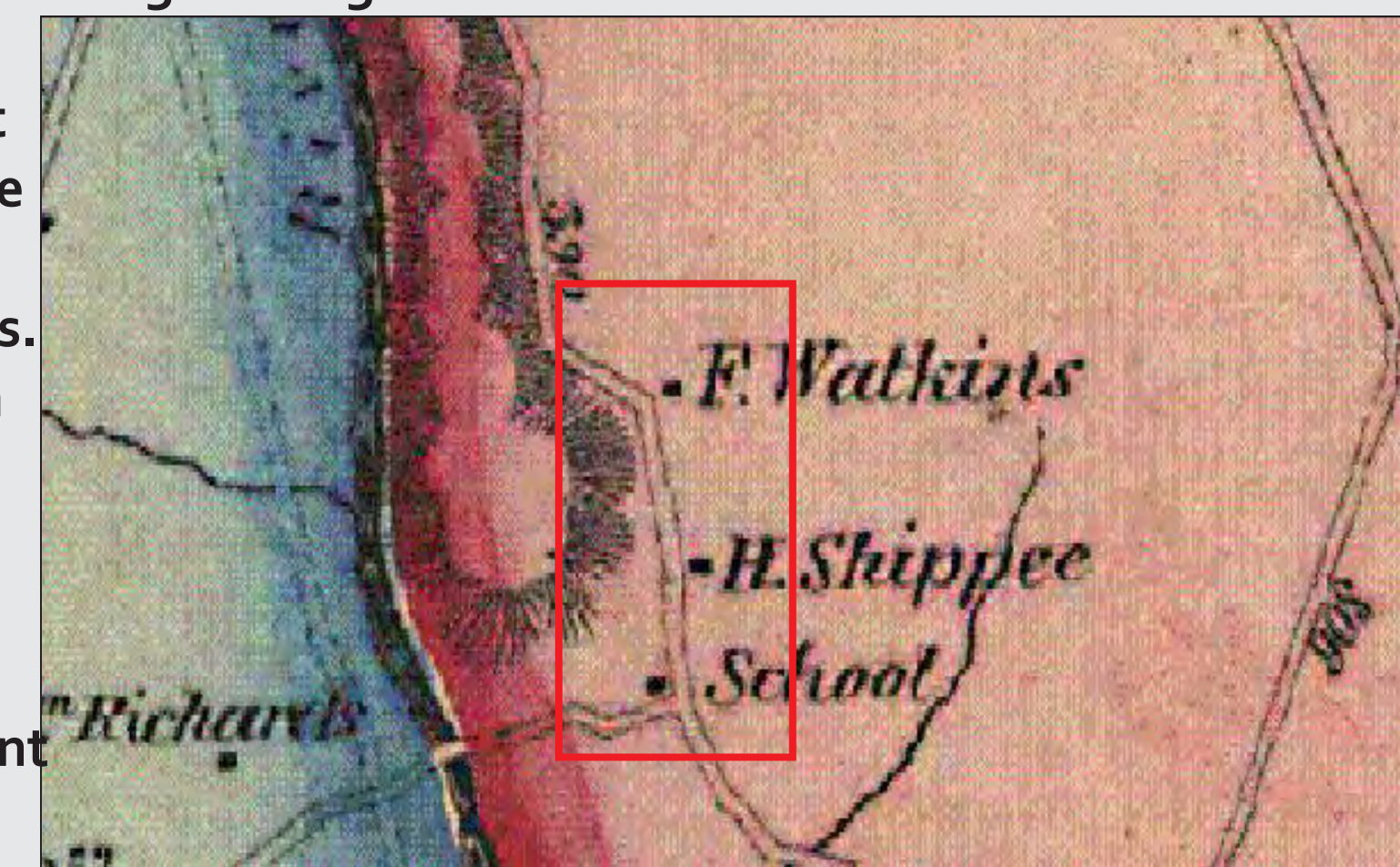
LiDAR data can also be used to compare historic aerial imagery with both topographic data and current aerial imagery. These images show a farmstead in Ashford, CT as it appeared in 1934. Its cleared fields, barn and outbuildings are now all under a dense forest canopy, making it impossible to see these features in aerial photography. LiDAR data (below) allows one to see not only the stone walls that demarcate field boundaries, but also all of the building foundations, and the road that passes through the farmstead.



LiDAR & ARCHAEOLOGICAL SITE IDENTIFICATION / ANALYSIS



In areas like Ashford, Connecticut, much of the landscape has become reforested since the 1860s. We can compare LiDAR to historic maps and gain insight into entire road networks and farmstead clusters that no longer are visible in aerial photos. We can then begin to answer why this widespread abandonment happened.

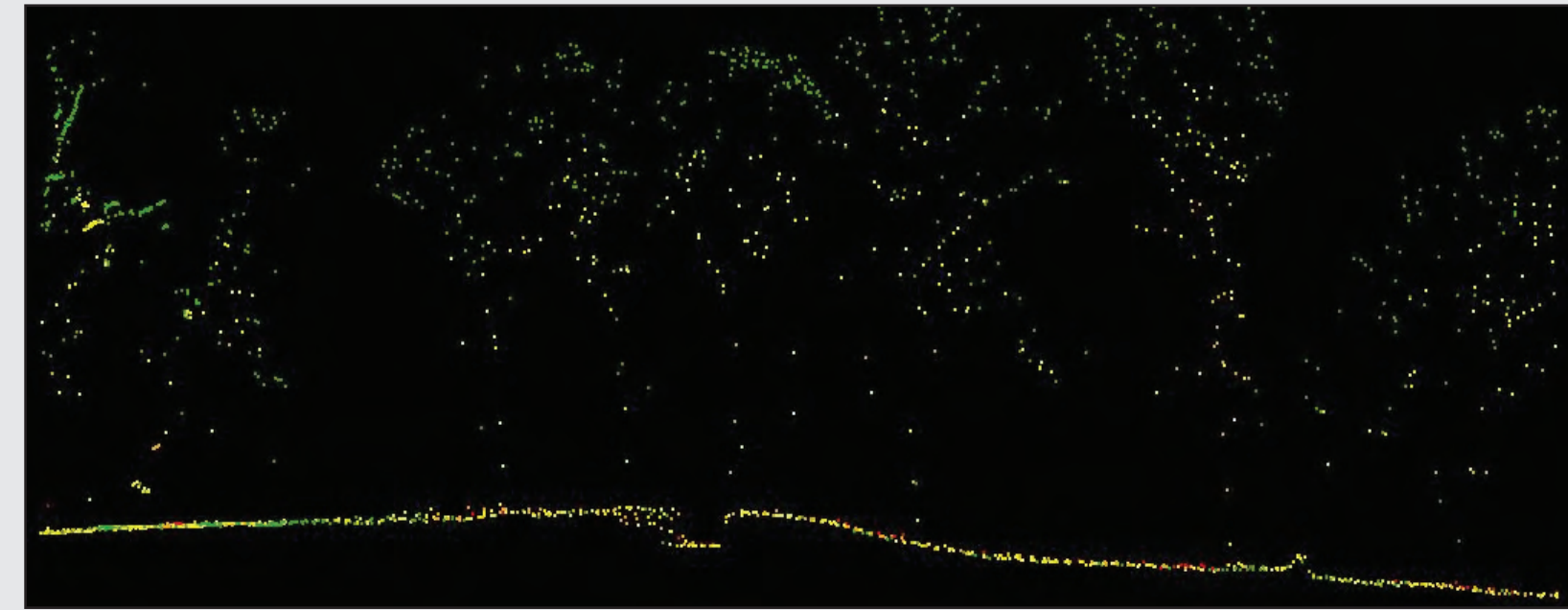
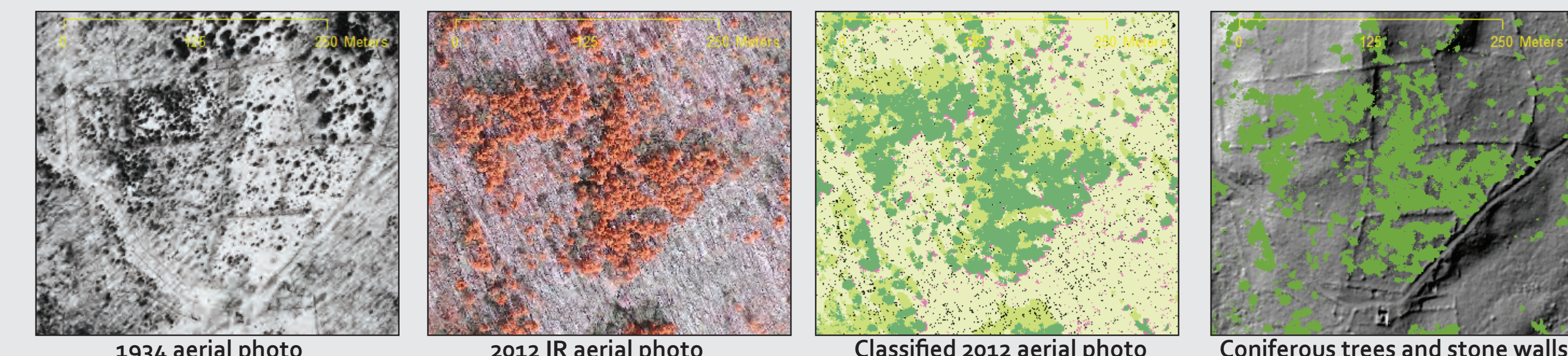


LiDAR makes it possible to identify historical archaeological sites before actually going into the field. Below, Xs indicate recorded archaeological sites, while stars indicate sites found using LiDAR.



LiDAR, LAND USE & FOREST COVER ANALYSIS

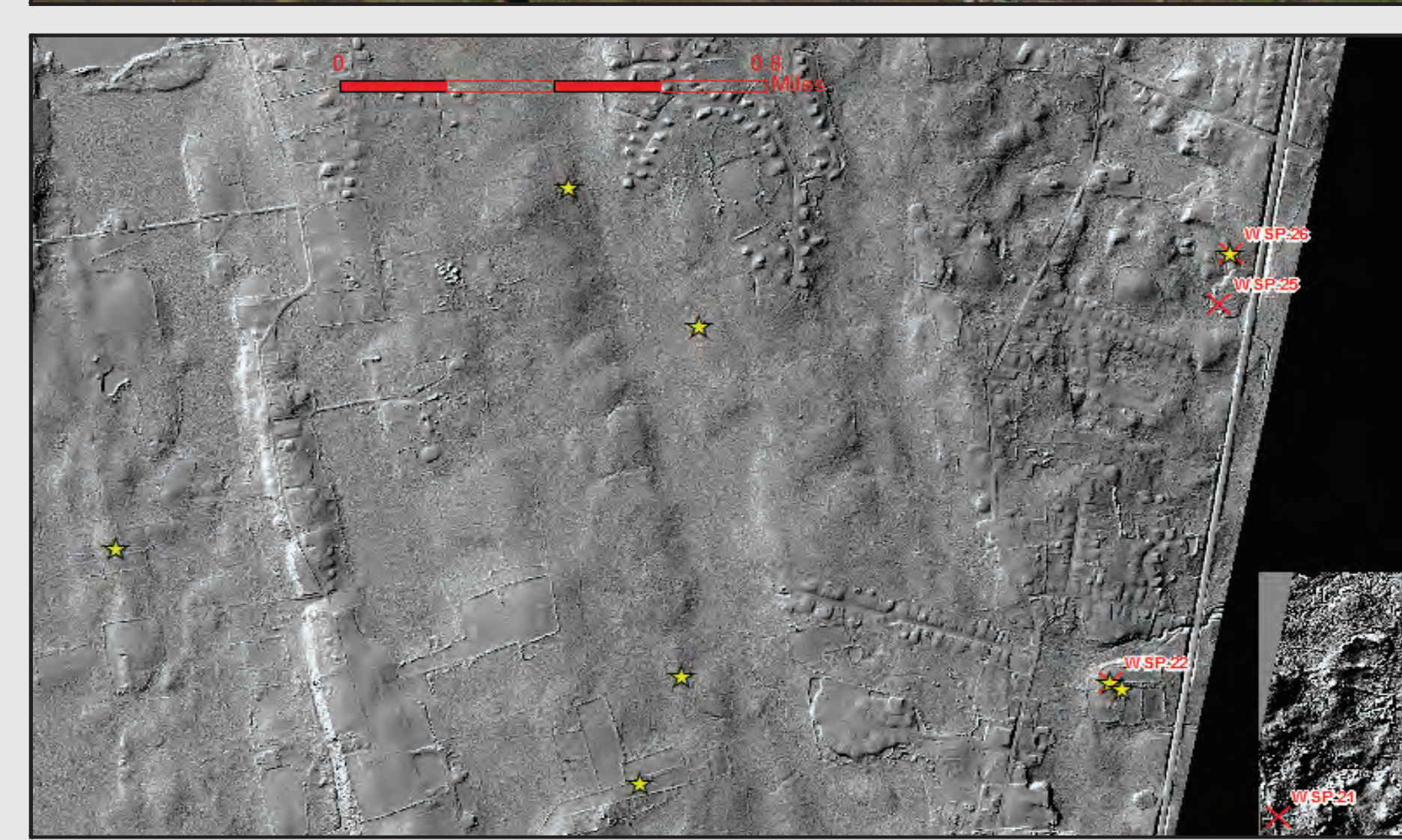
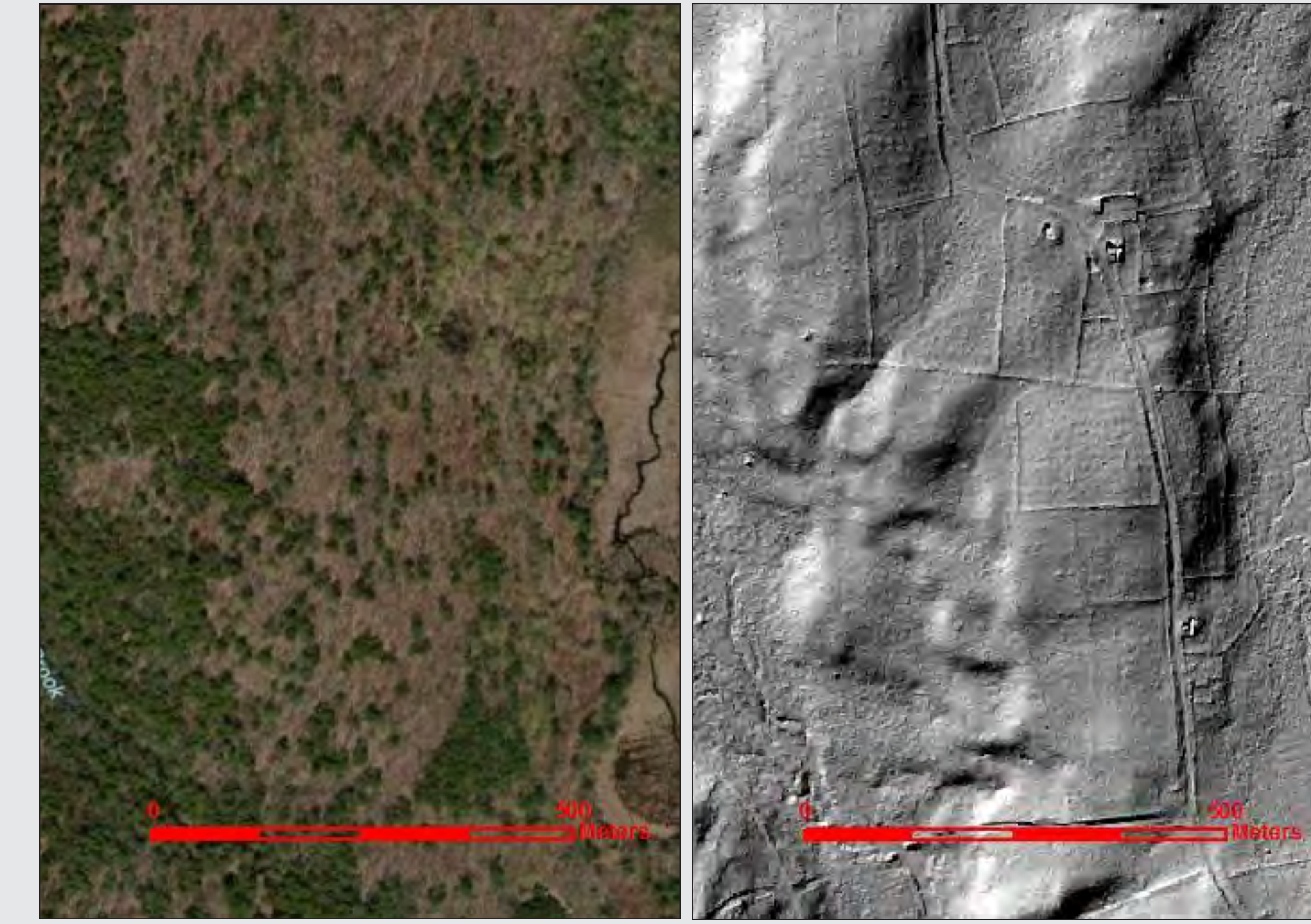
Ongoing research is demonstrating that LiDAR can be used with historical imagery to reconstruct historic land use and its impact on current vegetation patterns.



LiDAR point cloud profile of above area (denoted by red line). Note building foundation and stone walls. Classified by return number.



Photograph of foundation as seen in field



Example of historic site: building foundation with road and stone walls.

LiDAR, STONE WALLS & HISTORICAL PROPERTY DIVISIONS

Stone walls digitized from LiDAR data match property boundaries that were recorded in 1712. They also indicate how individuals laid out their land and divided their property. Many of these stone walls serve as modern property boundaries today. By examining their layout, density, and other attributes, we can begin to understand how historic land use and property divisions have influenced the modern landscape that we experience today.



- SOURCES:
- MAGIC: 2012 imagery, 1934 imagery
 - CLEAR: LiDAR status map
 - MassGIS: 1m LiDAR DEM (2011), LiDAR status map, Westport MA parcels
 - New Bedford Public Library: 1712 Crane Survey Map
 - USDA NRCS (CT): .las files for CT (2010)