Generalization for Multi-Scale Representation, Display, and Delivery of *The National Map* of the United States

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United States policy requires geospatial data and products developed by federal agencies be accessible for the cost of distribution. Accordingly, *The National Map* of the United States was developed through collaborative efforts coordinated by the United States Geological Survey (USGS) and includes products and services for the display and delivery of geospatial data to the nation. Primary products and services of *The National Map* include: The National Atlas®, US Topo maps, Historical Topographic Maps, and *The National Map* Viewer. The National Atlas provides a framework for digital cartography and access to numerous data themes at 1:1,000,000-scale and smaller. US Topo maps, the modern digital version of 1:24,000-scale 7.5-minute topographic map series, are easily downloaded from *The National Map* in geographically referenced portable document format (GeoPDF) files. In addition, nearly 180,000 for over 125 years of Historical Topographic Maps are available in GeoPDF through *The National Map*. *The National Map* Viewer allows users to inspect and download current topographic basemap data and products.

This presentation briefly reviews these services and development towards fully automated generalization for building integrated multi-representation databases for *The National Map* that enable multi-scale display of new designs for US topographic maps. For example, local resolution (1:12,000-scale or larger) hydrography compiled by state cooperators is pruned and simplified for seamless horizontal integration with surrounding 1:24,000-scale data. From these data, level-of-detail data production is laddered to 1:50,000 and smaller scales, such as 1:200,000, until National Atlas scales at 1:1,000,000 are reached. For transportation, roads are enriched using lengths of itineraries that may be traveled across them and calculated in a laddered manner. In addition to highway designations, this hierarchy on local roads allows collector routes to be emphasized, minor roads removed through thinning, and labeling limited to major roads, with increasing reduction in choices through scale.