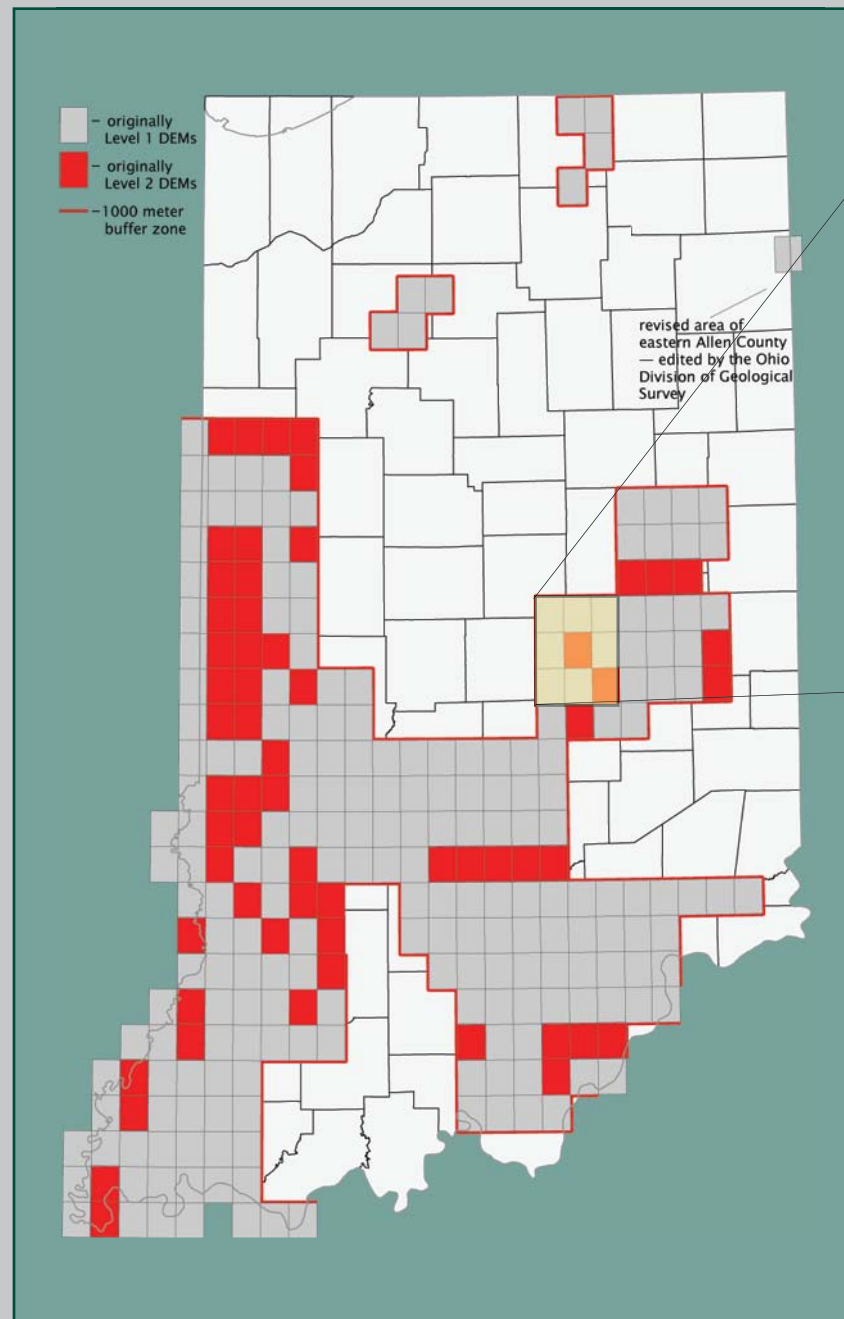




surface terrain of Indiana — A DIGITAL ELEVATION MODEL

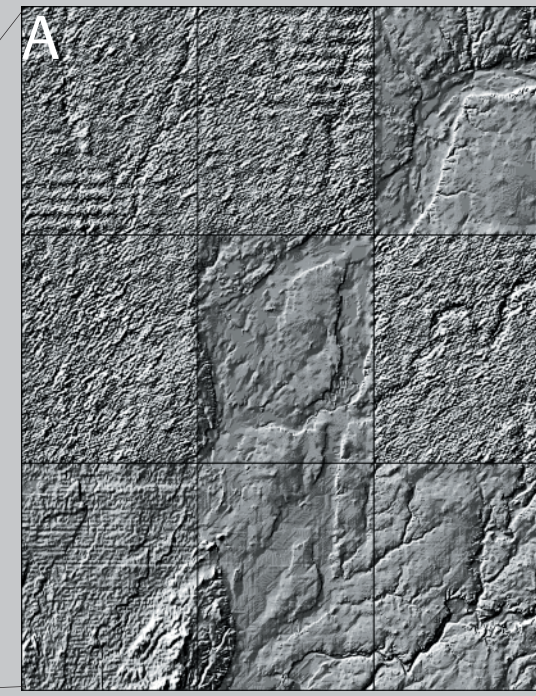
Indiana Geological Survey — revised DEM of Indiana



revisions in the DEM data set of Indiana

In 1999, the Indiana Geological Survey (IGS) acquired a part of the National Elevation Dataset (NED)—the best digital elevation model of Indiana at 30-meter resolution available at the time. The majority of the NED is good-quality data, however, parts of the data set are poor quality or Level 1 data (see map A, right).

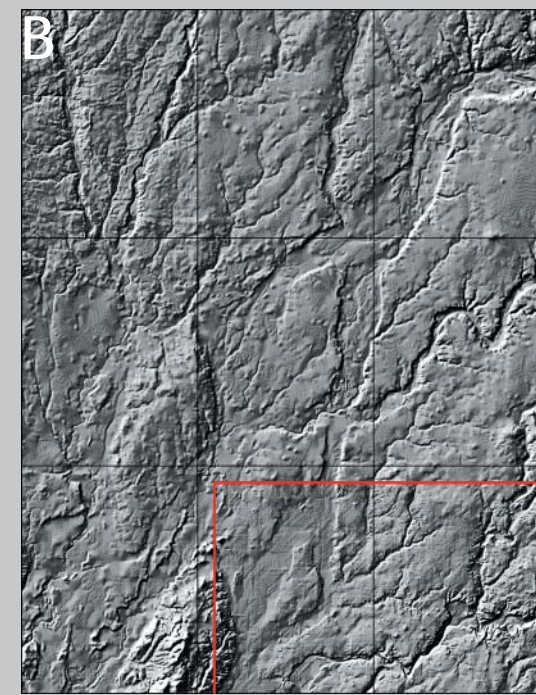
The IGS replaced the Level 1 areas in the Indiana portion of the NED with new digital elevation models (DEMs) which were made using several components (listed right) in ESRI ArcInfo. Some of the good-quality (Level 2) quadrangles were included in the process owing to their location within blocks of Level 1 data (see map B, right). A total of 275 quadrangles (216 Level 1 and 59 Level 2) in the Indiana data set were replaced. Also, where possible, the quadrangles adjacent to the Level 1 quadrangles were remade in order to create a nearly seamless splice at the edge of the new data. A 1,000-meter buffer zone was clipped from these neighboring quadrangles in order to blend the edges of the newly created areas into the original NED.



revision — an example

The digital elevation model of nine central Indiana 7.5-minute quadrangles before (A) and after the editing process (B and C).

A - Original NED, hillshaded. Five quadrangles are Level 1 (poor-quality) data and four quadrangles are Level 2 (good-quality) data. In the replacement process, the IGS replaced all the Level 1 and two Level 2 quadrangles (the northeast and central quadrangles) in this area.



B - Revised DEM, hillshaded. The red line indicates the boundary of the 1,000-meter buffer that was extended into the adjacent quadrangles. There is a slight textural difference between the areas created by the IGS and the areas created by the U.S. Geological Survey (USGS) (south of red line).

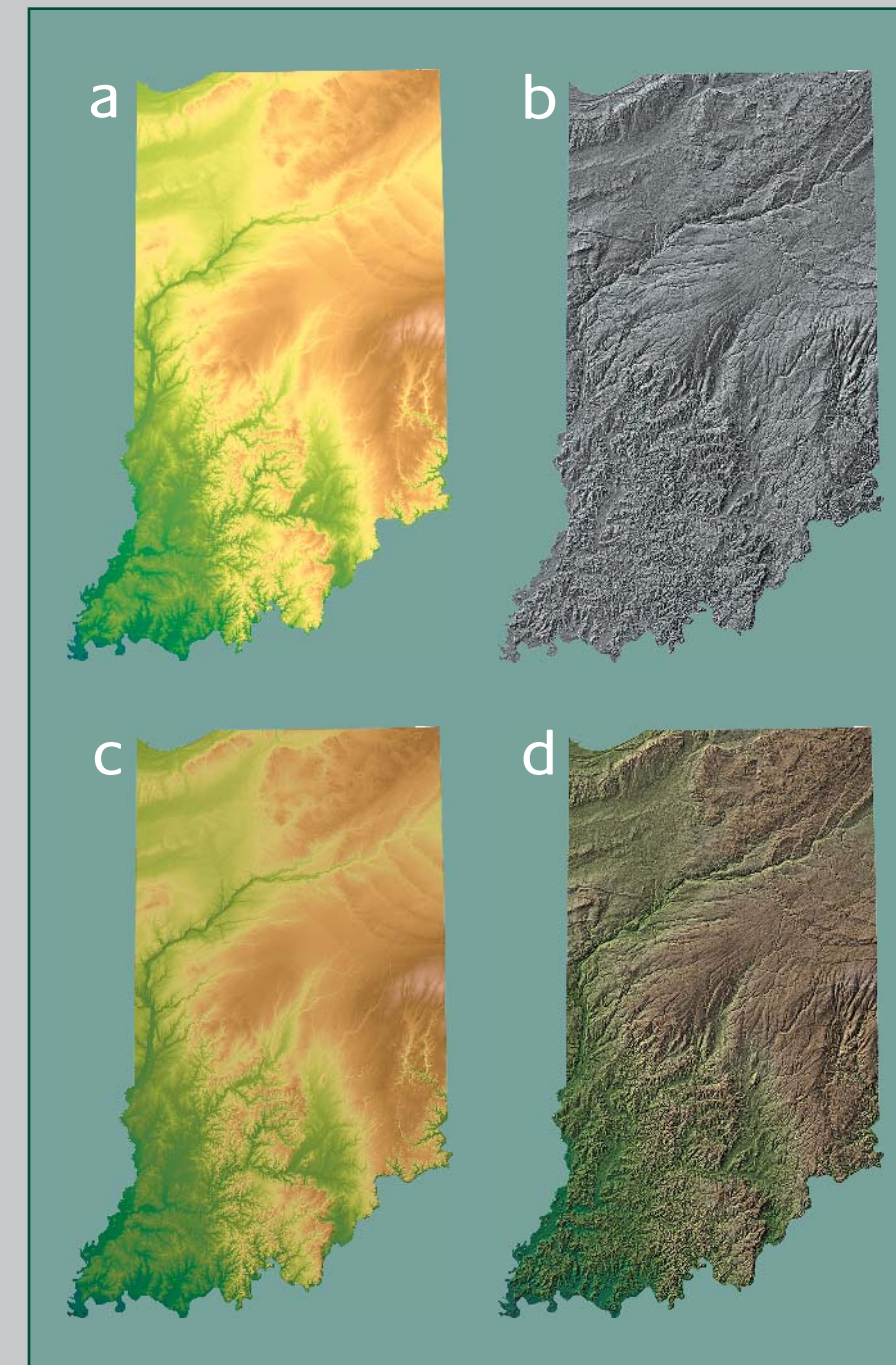


C - Revised DEM, same area, with a color ramp applied.

Components used

New digital elevation models were created in ArcInfo (ver. 8.2) using the TOPOGRID module and the following components:

- digital hypsography - contours attributed with elevation values
- digital waterbodies - lake polygons (ensure that lakes appear flat in the resulting DEM)
- digital hydrography - oriented stream data



output from GIS to raster images

The four images above are samples of raster images that were created from the new DEM using ESRI ArcView 3.3. First, the DEM (grid format) was imported into ArcView using the Spatial Analyst extension and a color ramp was applied. Second, the hillshade was created with the Compute Hillshade option from the Surface menu. Finally, the graphical images were created and exported using the extension Image Conversion-Georeferencing2*. This extension exports images of several file formats while maintaining original pixel size and lattice and creating an accompanying worldfile (.tfw).

- a - colored DEM
- b - grayscale hillshade
- c - combined colored DEM and the hillshade, exported from ArcView as one image
- d - colored DEM and the hillshade, exported from ArcView individually (A and B) and placed in Adobe Illustrator as separate layers, enhanced and saved as one image

*adapted from a script from Kenneth McVay (downloadable from ESRI's Web site [www.esri.com])



GIS to graphic arts

Image of IGS Poster 5—the surface terrain of Indiana. In this poster, the revised digital elevation model has been exported from ESRI ArcView 3.3 and brought into Adobe Illustrator/Avenza MAPublisher where adjustment layers were added. The file was then exported to Photoshop where a number of adjustment layers were added. The layout and design was completed in Adobe InDesign.

final note

Geologic interpretation of Indiana's landscape, which is dominated by glacial features, is dependent on 30-meter or better digital elevation models. Therefore, DEMs must be as accurate as possible to map this terrain. The next poster, Poster B, illustrates the use of DEMs and digital data for onscreen mapping and map production.

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