



The National Map - Orthoimagery

The Nation Needs *The National Map*

Governments depend on a common set of base geographic information as a tool for economic and community development, land and natural resource management, and health and safety services. Emergency management and homeland security applications rely on this information. Private industry, nongovernmental organizations, and individual citizens use the same geographic data. Geographic information underpins an increasingly large part of the Nation's economy.

Available geographic data often have the following problems:

- Do not align with each other because layers are frequently created or revised separately,

- Do not match across administrative boundaries because each producing organization uses different methods and standards, and

- Are not up to date because of the complexity and cost of revision.

The U.S. Geological Survey (USGS) is developing *The National Map* to be a seamless, continuously maintained, and nationally consistent set of online, public domain, geographic base information to resolve these issues. *The National Map* will serve as a foundation for integrating, sharing, and using other data easily and consistently.

In collaboration with other Federal, State, county, and local government agencies, the private sector, academia, and the public, the USGS will coordinate, integrate, and, where needed, produce and maintain base geographic data.

The National Map will include digital orthorectified imagery, elevation data, vector data for hydrography, transportation, boundary, and structure features, geographic names, and land cover information. The data will be the source of revised paper topographic maps.

Orthoimagery

Orthorectified digital aerial photographs and satellite images of one-meter pixel resolution or better make up the orthoimagery component of *The National Map*. The process of orthorectification removes most of the feature displacements and scale variations caused by terrain relief and sensor geometry. The result combines the image characteristics of a photograph with the geometric qualities of a map. The National Digital Orthophoto Program (NDOP) led the effort to complete national orthoimagery coverage based on photographs from the National Aerial Photography Program (NAPP). The NAPP and the NDOP are consortia of Federal agencies, principally the USGS, Natural Resources Conservation Service, Farm Service Agency, U.S. Forest Service, Bureau of Land Management, Federal Emergency Management Agency, and Environmental Protection Agency, committed to providing national photographic and orthoimagery coverage by combining funding resources and creating partnerships to coordinate requirements and costs with States, other government agencies, and the private sector.

The digital orthophoto quadrangle (DOQ) is the standard product for the initial national orthoimagery coverage. The DOQ is 1:12,000-scale, quarter-quadrangle centered, and 1-meter pixel resolution. DOQs are cast on the Universal Transverse Mercator projection

from black-and-white or color-infrared photographs. Each DOQ has an ASCII keyword header containing descriptive information about the image data, including photographic source type, date, software systems used to create the DOQ, and the production date of the digital elevation model metadata used in the orthophoto rectification process. DOQ accuracy is reported in accordance with the Federal Geographic Data Committee's (FGDC) "National Standard for Spatial Data Accuracy."

Orthoimagery maintenance is coordinated with the maintenance cycle of State orthoimagery program, and occurs through partnerships between Federal agencies, States, local governments, and private businesses. In addition to the standard DOQ product, this data layer supports a broader range of orthoimagery products, including natural color photographs, digital images, variable-sized footprints in any projection, and resolutions better than 1 meter. Orthoimagery data are archived in distributed databases with FGDC-compliant metadata either at the USGS or at the site of a data partner. Access and distribution of unrestricted public



Orthoimages provide information not easily represented on symbolized maps. (Holder, Fl.)

domain orthoimagery data on an National Spatial Data Infrastructure (NSDI) Clearinghouse registered node is ensured.

Applications of Orthoimagery

Orthoimagery supports various geographic information analysis and mapping applications. These data are used to develop and revise vector files of transportation, cadastral, and land use/land cover information. Federal, State, and county agencies use orthoimagery as a base map for wetlands, soil, land parcel, farm-field boundary, forest inventory, and other natural resources mapping, analysis, and planning applications. Benefits of access to public domain orthoimagery include the following:

A common and accurate image base map is available for inventories, digitizing, and analyses of many themes of geographic information.

Developing geospatial data referenced to accurate orthoimagery facilitates the integration and sharing of data, promotes cooperative processes, and reduces high-cost duplication of database development.

Certain data layers of information, such as land cover, are more completely represented on and can be extracted directly from orthoimagery, compared with symbolized maps.

Users can make accurate measurements of distances, positions, and areas from orthoimagery.

Orthoimages can be combined with digital elevation models for slope, aspect, and three-dimensional analyses.

Orthoimagery can be digitally mosaicked, resampled, and merged into a single image of a larger area.

Data Availability and Plans

Orthoimagery data from the initial national DOQ coverage are accessible from the USGS Sales Database and can be ordered online at earthexplorer.usgs.gov or by contacting any Earth Science Information Center.

The orthoimagery maintenance plan consists of two approaches:

NAPP and NDOP will continue NAPP photograph collection and DOQ production over States that require 1:12,000-scale quarter-quadrangle orthoimagery based on Federal and State funding partners' requirements. DOQs will be archived and accessible from the USGS Sales Data Base.

NAPP and NDOP will also partner with States that have their own high-resolution (1 meter or better) orthoimagery program. The high-resolution orthoimagery will be accessible from State archives on an NSDI Clearinghouse node in the public domain.

Partnership Opportunities

Organizations interested in partnering with the USGS to develop orthoimagery data for *The National Map* should contact the USGS mapping liaison in their State. The list of liaisons is available at "For More Information" at mapping.usgs.gov/index.html#partners. Click on "Mapping Partnership Program."

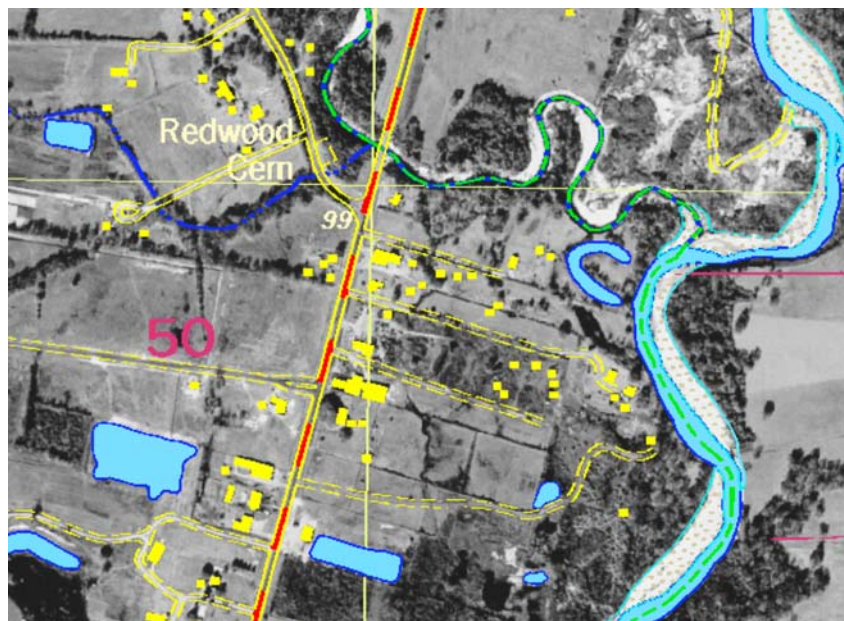
Information

Further information about *The National Map* and orthoimagery is available from

the Cooperative Topographic Mapping Program, Mail Stop 511, USGS National Center, 12201 Sunrise Valley Drive, Reston, VA 20192. For additional information about *The National Map*, visit the nationalmap.usgs.gov Web site.

For information on other USGS products and services, call 1-888-ASK-USGS or visit the general interest publications Web site on mapping, geography, and related topics at mac.usgs.gov/mac/isb/pubs/pubslists/.

For additional information, visit the ask.usgs.gov Web site or the USGS home page at www.usgs.gov.



Orthoimages are a source of updated feature content for The National Map (Fred, La.).