

**January 2005**

# Digital Orthophotos

## Introduction

Orthophotos are most commonly described by their resolution. Resolution refers to the linear ground distance represented by a single pixel in the digital image. For example, in a one-meter resolution ortho image, each pixel represents a one-meter by one-meter square cell on the ground.

Orthophotos are used extensively as a base map in geographic information systems (GIS) because of the information naturally conveyed by an aerial photograph. Orthophotos are unique, however, in that they have the positional accuracy of a map.

In addition, orthophotos are commonly used to derive other datasets such as transportation routes, water features, field boundaries, and building outlines. They also serve as a base map for other data themes such as wetlands, soils, and forest inventories.

As a technology development, digital orthophotos began to appear in the late 1980s. The concept of a National Digital Orthophoto Program (NDOP)<sup>1</sup> was proposed in 1990 by the U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS), USDA-Farm Services Agency (USDA-FSA) and the US Geological Survey (USGS). Technical specifications (quarter-quadrangle format, black & white images, one meter resolution) were soon established, and the NDOP began producing digital orthophotos in 1993 using National Aerial Photography Program (NAPP) imagery. The NDOP facilitated virtual nationwide coverage of the lower 48 states by 2002.

In the mid-1990s counties in Wisconsin began to acquire their own digital orthophotos, usually at a resolution finer than one meter. Wisconsin Land Information Program funding supported many of these projects.

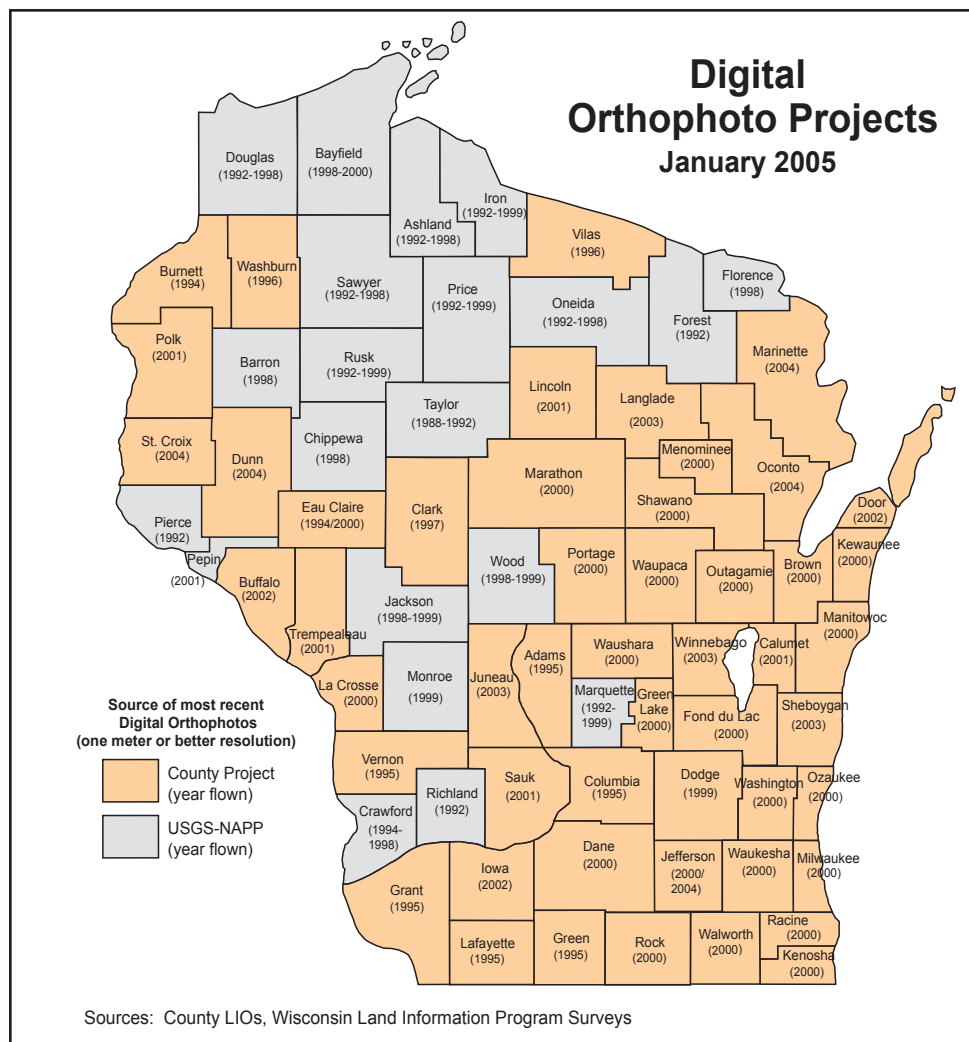
Today, more than two-thirds of the state's counties have acquired their own digital orthophotos at resolutions ranging from six inches to three feet.

## Current Status

2005 will be a very busy year for digital orthophoto acquisition in Wisconsin. In an effort to take advantage of opportunities made possible through group purchasing arrangements, many Wisconsin counties began banding together in 2003. Two regional consortia were formed, one in the southwest part of the state consisting of 10 counties, and another in the northeast with 27 counties. The latter consortium is organized under the banner of three regional planning commissions: Bay-Lake<sup>2</sup>, East Central<sup>3</sup>, and North Central<sup>4</sup>. The Southeast Wisconsin Regional Planning Commission (SEWRPC) is also coordinating an

At the same time, many municipalities are planning to acquire orthophotos in 2005. Some municipalities are partnering with their county to help fund county-wide projects at higher resolutions than originally planned. Others are taking advantage of special vendor pricing made possible through the county consortia to acquire very high resolution imagery (six inches or better.)

Finally, in addition to the high resolution county and municipal projects, the entire state is planned to be flown by the USDA-FSA at a resolution of at least two meters.



Unlike many county projects, imagery for the National Agriculture Imagery Program (NAIP)<sup>5</sup> will be acquired in full-color during the summer months ("leaf on"). National in scope, NAIP sacrifices positional accuracy in favor of a quick turnaround and annual coverage.

Several Wisconsin counties are financially partnering with USDA-FSA to improve the NAIP resolution in their respective counties to one meter. As additional state and local part-

ners come on board, the possibility exists for the entire state to be acquired at a one meter resolution. This has yet to be finalized as of January 2005.

#### How to Find Orthophotos

The State Cartographer's Office maintains OrthoFinder<sup>6</sup>, a tool on our web site to help you quickly identify and view information on orthophoto projects in Wisconsin.

With OrthoFinder you can identify the name

and acquisition date for all of the approximately 4500 Wisconsin digital orthophoto quarter-quadrangles produced under the specifications of the National Digital Orthophoto Program, generally from image dates of 1992 and 1998.

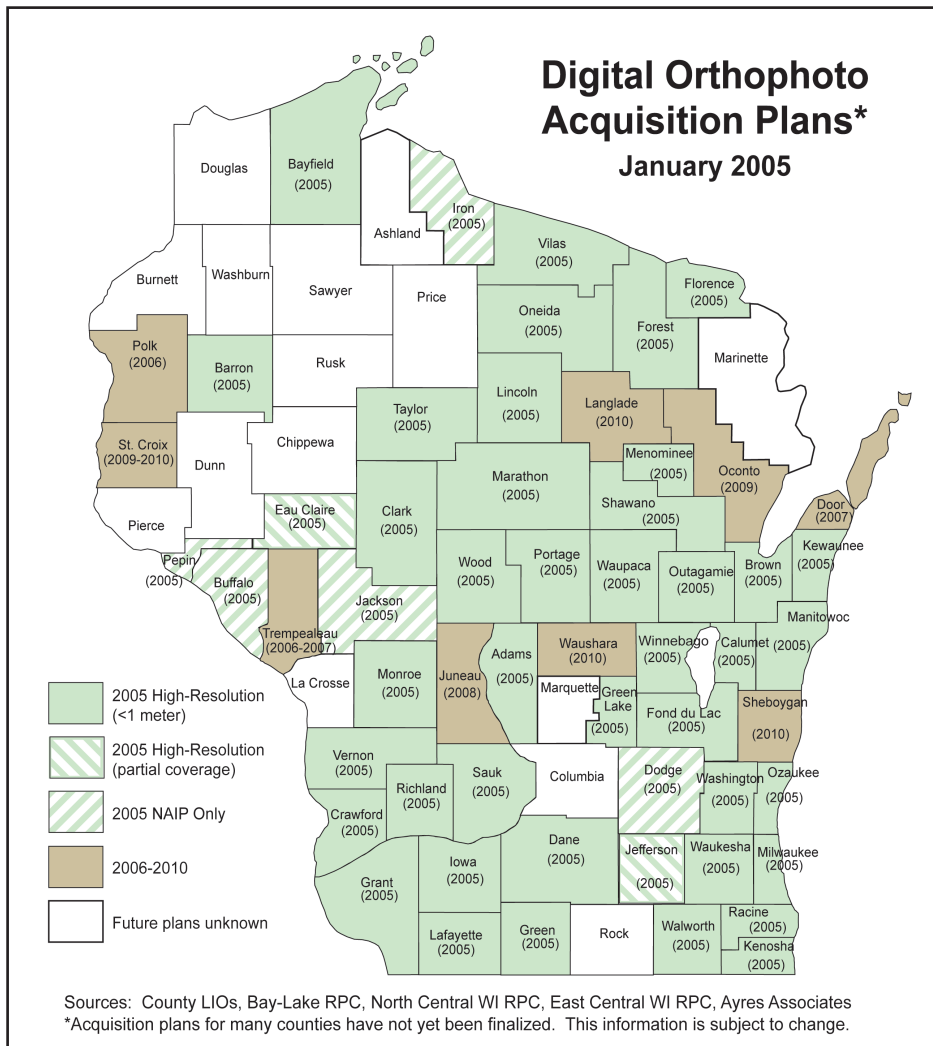
OrthoFinder also allows you to locate locally produced projects. This includes those developed and funded by counties and municipalities.

#### Where to Obtain

Orthophotos generated as part of a high-resolution county project are typically obtained directly from the county Land Information Office<sup>7</sup>. For municipal projects, contact the local planning or engineering office. Cost and distribution policies vary significantly.

USGS Digital orthophoto quadrangles (DOQs) may be purchased from the U.S. Geological Survey<sup>8</sup>. Purchase information and prices are listed on the USGS web site listed below.

**For more information on orthophotography, visit**  
**[www.sco.wisc.edu/ortho/](http://www.sco.wisc.edu/ortho/)**



## Web References

1. National Digital Orthophoto Program  
[www.ndop.gov](http://www.ndop.gov)
2. Bay-Lake RPC  
[www.baylakerpc.org](http://www.baylakerpc.org)
3. East Central Wisconsin RPC  
[www.eastcentralrpc.org](http://www.eastcentralrpc.org)
4. North Central Wisconsin RPC  
[www.ncwrpc.org](http://www.ncwrpc.org)
5. USDA Aerial Photography Field Office:  
[www.apfo.usda.gov/NAIP.html](http://www.apfo.usda.gov/NAIP.html)
6. State Cartographer's Office - OrthoFinder:  
[www.sco.wisc.edu/orthocat/](http://www.sco.wisc.edu/orthocat/)
7. Wisconsin County Land Information Officers:  
[www.doa.state.wi.us/dir/lio\\_officers.asp](http://www.doa.state.wi.us/dir/lio_officers.asp)
8. U.S. Geological Survey:  
[edc.usgs.gov/products/aerial/doq.html](http://edc.usgs.gov/products/aerial/doq.html)



The State Cartographer's Office has been Wisconsin's source for information about maps and geographic data for 30 years. Located in Science Hall on the UW-Madison campus, the SCO maintains a large and diverse website including a bi-monthly newsletter, catalogs, calendar, contact lists, and background information on mapping topics. Our staff presents educational programs and workshops, and participates in a wide range of organizations.

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