

## AERIAL PHOTOGRAPHS

### **What are Aerial Photographs?**

Aerial photographs are images of the land taken from an airplane and printed on 9"x9" photographic paper.

### **Why are Aerial Photographs Important?**

Aerial photographs are a useful tool in studying changes on the surface of the earth over time. They are particularly valuable in land use and land cover analyses, and comparing older data sets with new information. They are a record of what was on the land at the time the photograph was taken, and can be used for many types of studies.

### **Aerial Photographs in Tompkins County**

Aerial photographs exist for Tompkins County for each decade since 1938. A Cornell University aerial photograph library houses aerial photographs for Tompkins County and other counties in New York State (also dating back to 1938).

An important fly-over was conducted in 1992, when Tompkins County, in a consortium with New York State Electric and Gas and the City of Ithaca, contracted to have black and white photographs taken of the County. These black and white aerial photos of Tompkins County were taken at a scale of 1:12,000. The consortium also mapped the planimetric data (the buildings, roads, waterways, and other items) in order to make it geographically correct. A specialized process was used to orthographically draw and locate the data that was captured in these photos. These data sets are now available in a GIS format and are used to produce maps for Tompkins County.

The most recent aerial photographs of Tompkins County were taken in the spring of 1999, before the tree leaves emerged. The result of that fly-over was a set of natural color photographs of the entire County that can be viewed in three dimensions with a stereoscope.

### **Maps and Data**

Aerial photographs contain distortions and, therefore, are unreliable for measuring distances unless they are orthographically rectified (a process that takes the distortion out of photographs). Conventional aerial photographs contain image displacements caused by camera lens distortion, camera tip and tilt, terrain relief, and scale. These types of distortions are removed through a process of rectifying the original photographs to create a computer file referred to as a digital orthophoto. The data set compiled from the 1999 aerial photographs has not yet been rectified for the County, however, the City of Ithaca has digitized and rectified some of these images for their purposes.

Maps can be generated from aerial photographs. For example, the 1995 Land Use and Land Cover Inventory of Tompkins County was created by using digital images (see DOQQs section), as well as aerial photographs, to interpret the land uses. Highly specialized processes are used to turn information from photographs into useful maps.

For a map of this information, in paper or digital format, contact the Tompkins County Planning Department.

### **References and Resources:**

City of Ithaca Planning Department, City Hall, 108 E. Green Street, Ithaca, NY 14850 607-274-6550

Institute for Resource Information Systems (IRIS), Rice Hall, Cornell University, Ithaca, NY 14850, 607-255-0800.

Tompkins County GIS Program, Information Technical Services, 128 East Buffalo Street, Ithaca, NY 14850, 607-274-5418.  
<http://www.tompkins-co.org/gis>

Tompkins County Planning Department, 121 East Court St, Ithaca, NY 14850 607-274-5560.

WILD 15/4 UAGA-F  
Nr 13094 152.62

0 0 0

5/7/92 1" = 1000'

TOMPKINS COUNTY R No 9



## 1992 Black and White Aerial Photograph



References:  
The data contained in this map were provided by the Tompkins County GIS Division,  
The City of Ithaca, Michael Baker Jr. Inc, and the Tompkins County Planning Department.



Tompkins County Planning Department  
Natural Resources Inventory



## 1999 Color Photos



References:  
The data contained in this map were provided by the Tompkins County GIS  
Division, The City of Ithaca and the Tompkins County Planning Department.



## DIGITAL ORTHOGRAPHIC QUARTER QUADRANGLES (DOQQS)

### **What are Digital Orthographic Quarter Quadrangles?**

Digital Orthographic Quarter Quadrangles (DOQQs) are geographically corrected digital images of the surface of the earth. Conventional aerial photographs, as described in the previous section, contain image displacements caused by camera lens distortion, camera tip and tilt, terrain relief, and scale. These types of distortions are removed through a process of rectifying the original photographs to create a computer file referred to as a digital orthophoto. A number of these digital orthophotos are merged together to create a single DOQQ. These digital orthophotos were produced at a scale of 1:12,000 in quarter quadrangles (one quarter of a 7.5 minute USGS quadrangle).

### **Why are Digital Orthographic Quarter Quadrangles Important?**

As with conventional aerial photographs, various land cover and land use features can be interpreted from DOQQ images. The DOQQs are an excellent record of the land's surface at the time the images are taken. They can be viewed, using a geographic information system (GIS), with other Tompkins County digital data sets, such as tax parcels, road names, or hydrology, to assist planners in identifying land use and land cover features during site development reviews. The DOQQs prepared from the 1995 fly-over of Tompkins County have been used to create a detailed land use and land cover (LULC) digital data set for Tompkins County. Since DOQQs are geographically correct, accurate measurements can be taken from these images. This can be most helpful when the distance between land features needs to be determined and areas of particular features, such as forests and water bodies, need to be calculated for research and analytical purposes.

### **Digital Orthographic Quarter Quadrangles Images in Tompkins County**

In Tompkins County, the majority of the imagery was captured from sensors in airplanes as part of the National Aerial Photography Program (NAPP) in March and April of 1995, with a few areas photographed in April 1994. The next set of DOQQs for Tompkins County is scheduled for flight, production, and distribution in 2002.

The 1995 images were captured with a color-infrared sensor. Color infrared is ideal for differentiating wet and dry areas and various types of vegetation and vegetative health. In color infrared images, live vegetation appears in various shades of red and pink; buildings and roads appear light gray/white; water appears dark blue/black; and barren/dormant ground appears green/brown. Since the NAPP images were captured in the early spring, before most broad-leaf deciduous plants leafed out, these plants appear black; the dark red areas represent coniferous vegetation; and the light red or pink areas represent grass and/or early field crops. There is significant color variation among the different DOQQs (lighter vs. darker and/or redder vs greener) due to the variation in light and moisture that occurred over the time period during which the NAPP images were captured.

### **Maps and Data**

To order Digital Orthographic Quarter Quadrangles contact the United States Geological Survey, EROS Data Center.

For a map of this information, in paper format, contact the Tompkins County Planning Department, 121 East Court Street, Ithaca, NY, (607) 274-5560.

### **Resources and References**

New York State DEC, 625 Broadway, Albany, NY 12233. <http://www.nysgis.state.ny.us/orthoprogram.htm>

Tompkins County GIS Program, Information Technical Services, 128 East Buffalo Street, Ithaca, NY 14850, 607-274-5418. <http://www.tompkins-co.org/gis>

Tompkins County Planning Department, 121 East Court Street, Ithaca, NY 14850, 607-274-5560.

United States Geological Survey, EROS Data Center, Sioux Falls, South Dakota, 57198, 605-594-6151, Fax: 605-594-6589.  
Email: [custserv@edcmail.cr.usgs.gov](mailto:custserv@edcmail.cr.usgs.gov). Website: <http://edcwww.cr.usgs.gov/eros-home.html>.



## 1995 Digital Orthographic Image

One inch equals 1000 feet



500 0 500 1000 1500 Feet

New York State Plane  
North American Datum 1983

### References:

The data contained in this map were provided by the New York State Department of Environmental Conservation and the Tompkins County Planning Department.



Tompkins County Planning Department  
Natural Resources Inventory

## LAND USE AND LAND COVER

### What are Land Use and Land Cover?

Land use refers to the built landscape; land that has been altered for a specific purpose, such as residential, commercial, or industrial use. Land cover refers to land that has not been altered or has natural vegetation, such as forest, grass, brush, or some other natural surfaces such as rock or sand.

### Why are Land Use and Land Cover Important?

The current land use and land cover information enables communities to identify existing land use patterns, and, consequently, make better informed decisions concerning proposed land uses, development suitability analyses, and comprehensive planning. These data provide a static picture of development patterns, may be used as a benchmark for future land use and land cover analyses, and may be used for historical analyses when old data becomes available in Geographic Information System (GIS) format.

### Land Use and Land Cover in Tompkins County

Land use and land cover data from 1995 have been mapped into a single GIS coverage, Land Use and Land Cover (LULC), which form a basis for comprehensive study of the land surface in Tompkins County.

The LULC data set was produced by interpreting color infrared digital images from 1995. A quality assessment was performed, giving this data set over 93% accuracy by individual classes. The minimum mapping unit for this project was one-half acre.

A specialized classification system of 63 individual classes was created by the Tompkins County Planning Department based on the Land Use Natural Resource (LUNR) inventory developed by Cornell University in 1969. This will allow the analysis of land use changes.

The 63 individual classes have been grouped into 10 major categories.

**Table 6: Land Use and Land Cover in Tompkins County**

Major Category	Land Area	Examples of Individual Classes
Agriculture	30.47%	Cropland, Pastures, Inactive Farmland
Forest/Brush/Grass	53.42%	Deciduous, Coniferous, and Mixed Forests
Water and Wetlands	6.42%	Natural Lakes/Ponds, Wetlands
Residential	6.84%	High, Medium, and Low Density Residential
Commercial	0.42%	Retail Stores, Central Business Districts, Malls, Offices
Industrial	0.53%	Extractive Operations, Light Industry, Utilities
Outdoor Recreation	0.69%	Golf Courses, Ball Fields, Parks
Public/Private Institutional	0.58%	Educational Facilities, Cemeteries, Public Works
Transportation	0.24%	Airports and Airstrips, Railroads, Highways
Other	0.39%	Disturbed Land, Barren Land

Source: Tompkins County Planning Department

Statistics for the percentages of various land uses and land covers can be extracted for other political units or watersheds within Tompkins County.

### Maps and Data

For a map of this information, in paper or digital format, or for information on the Land Use Land Cover Project methodology, contact the Tompkins County Planning Department. For additional information on Cornell's LUNR project, contact the Institute for Resource Information Systems (IRIS), Rice Hall, Cornell University.

**Resources and References**

Cornell University Geospatial Information Repository (CUGIR) <http://cugir.mannlib.cornell.edu/>

Institute for Resource Information Systems (IRIS), Rice Hall, Cornell University 607-255-0800.

Tompkins County GIS Program, Information Technical Services, 128 East Buffalo Street, Ithaca, NY 14850, 607-274-5418.  
<http://www.tompkins-co.org/gis>

Tompkins County Planning Department, 121 East Court Street, Ithaca, NY 14850, 607-274-5560.