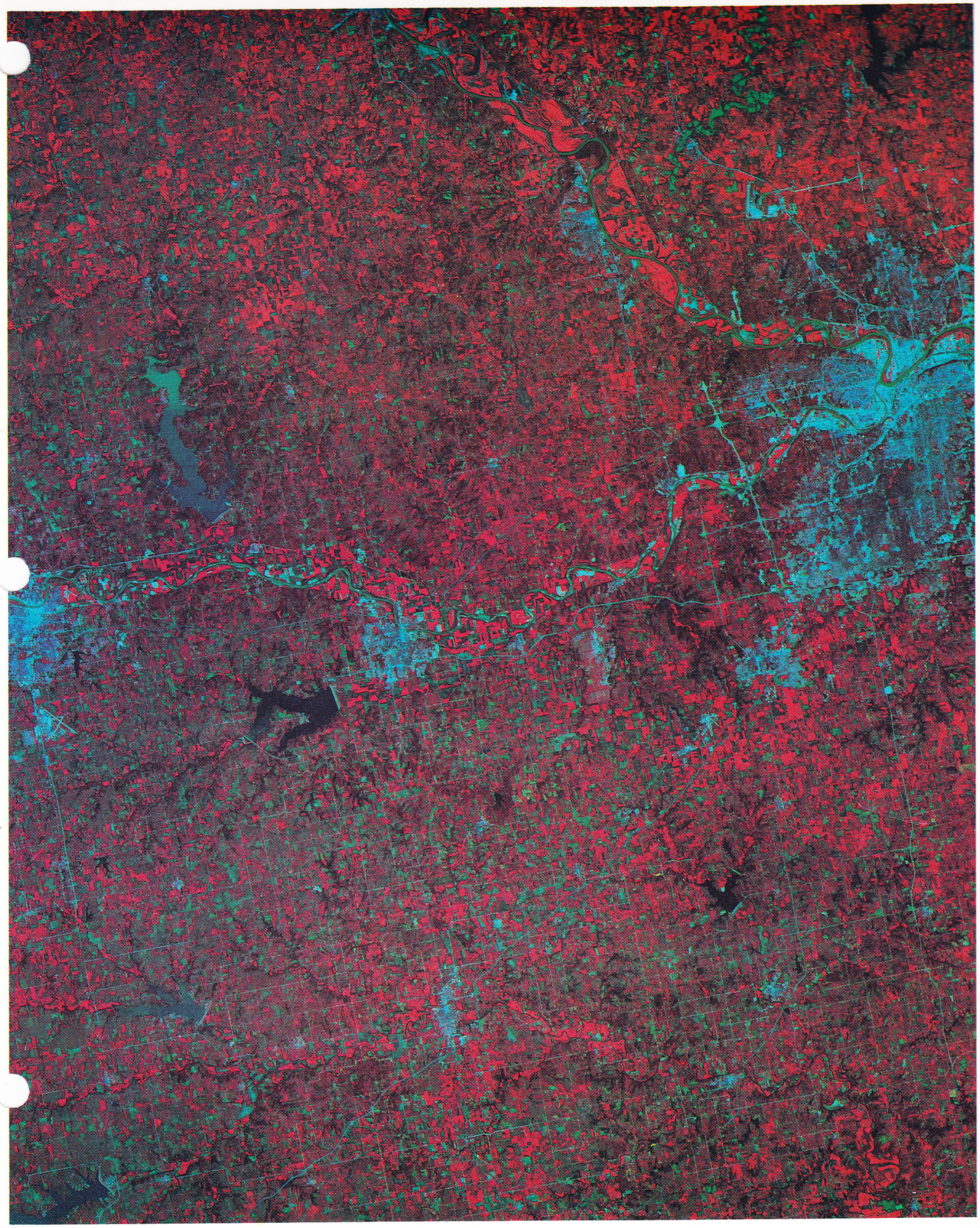

Kansas—Color Infrared

This image is from the Landsat 4 satellite, one of five satellites in the U.S. Government Landsat series. The series began with the July 23, 1972, launch of the Earth Resources Technology Satellite (ERTS-1), later named Landsat 1 and continues today with Landsat 5. Landsat 4 orbits the Earth at an altitude of 705 kilometers (440 miles) and covers the entire globe on a 16-day cycle. The Thematic Mapper (TM) has a spatial resolution or pixel size of 30 meters (one-quarter acre).

The present image is a TM image of east-central Kansas, dated September 3, 1982 (Scene identification number 40049-16273, path 27, row 33). The image was produced at a scale of approximately 1:1,000,000 (one inch on the image represents approximately 16 miles on the earth). This particular image is a false-color composite image, which is similar to a false-color infrared photograph. Lush or green vegetation is bright red, native grasslands are light red to brown, urban areas or bare ground are light blue-gray, and clear water is deep blue or blue-green.

Three large reservoirs are visible on the left side of the image. From top to bottom (north to south) these reservoirs are Perry, Clinton, and Pomona Lakes. The darker, blue color of Clinton Lake seems to indicate clearer water than the lighter blue (more turbid or muddy) water of Perry or Pomona Lake. Also easily distinguished on the image is the large metropolitan area of Kansas City on the right edge of the image. Kansas City is located at the confluence of the Missouri River flowing from the upper left (northwest) and the somewhat smaller Kansas River flowing from the left or west. Other urban areas with the distinctive light blue-gray color are Lawrence (directly west of Kansas City) and part of Topeka on the west edge of the image. Forbes Field Airport can be seen directly south of Topeka. Major roads and highways are visible as thin blue-gray lines, such as Interstate Highway 35 which angles northeast into Kansas City. Numerous major streets and highways are evident in and around Kansas City. Also of note is the regular patchwork of smaller roads, particularly in the southeast quarter of the image. These smaller roads generally follow the one-mile section lines that are a result of the range and township system. The presence of these section roads in the eastern portion of the image and their absence in the western portion relates to the density of settlement and level of land use intensity.

The spatial pattern of urban areas visible on this image is also interesting. Note that the three similarly-sized communities surrounding Kansas City are all approximately equidistant from it. By road, Leavenworth (northwest of K.C.) is 30 miles distant; Lawrence is 37 miles away and Ottawa (to the southwest) is 55 miles from Kansas City but approximately 33 miles from Olathe, the smaller town just southwest of Kansas City.

The distinctive bright red color across the image denotes areas of lush vegetation or active agricultural fields. In the north and western sections of the image, the agricultural areas are located primarily along the river or creek bottoms. Note the flood plain of the Missouri River to the northwest of Kansas City and that of the Kansas River between Kansas City and Topeka. In the southeast portion of the image, the agricultural areas are found in both the bottomlands and as rectangular fields within the regular sections. Fallow or open agricultural fields are noted in the southern portion as rectangular areas of a light blue-gray color. Few large areas of forest are present in this portion of the Great Plains. Within this image, forest is represented by a deep reddish-brown color, and illustrated by small areas just northwest and west of Kansas City. Small, finger-like areas of forest which highlight the drainage pattern are also present on the image.

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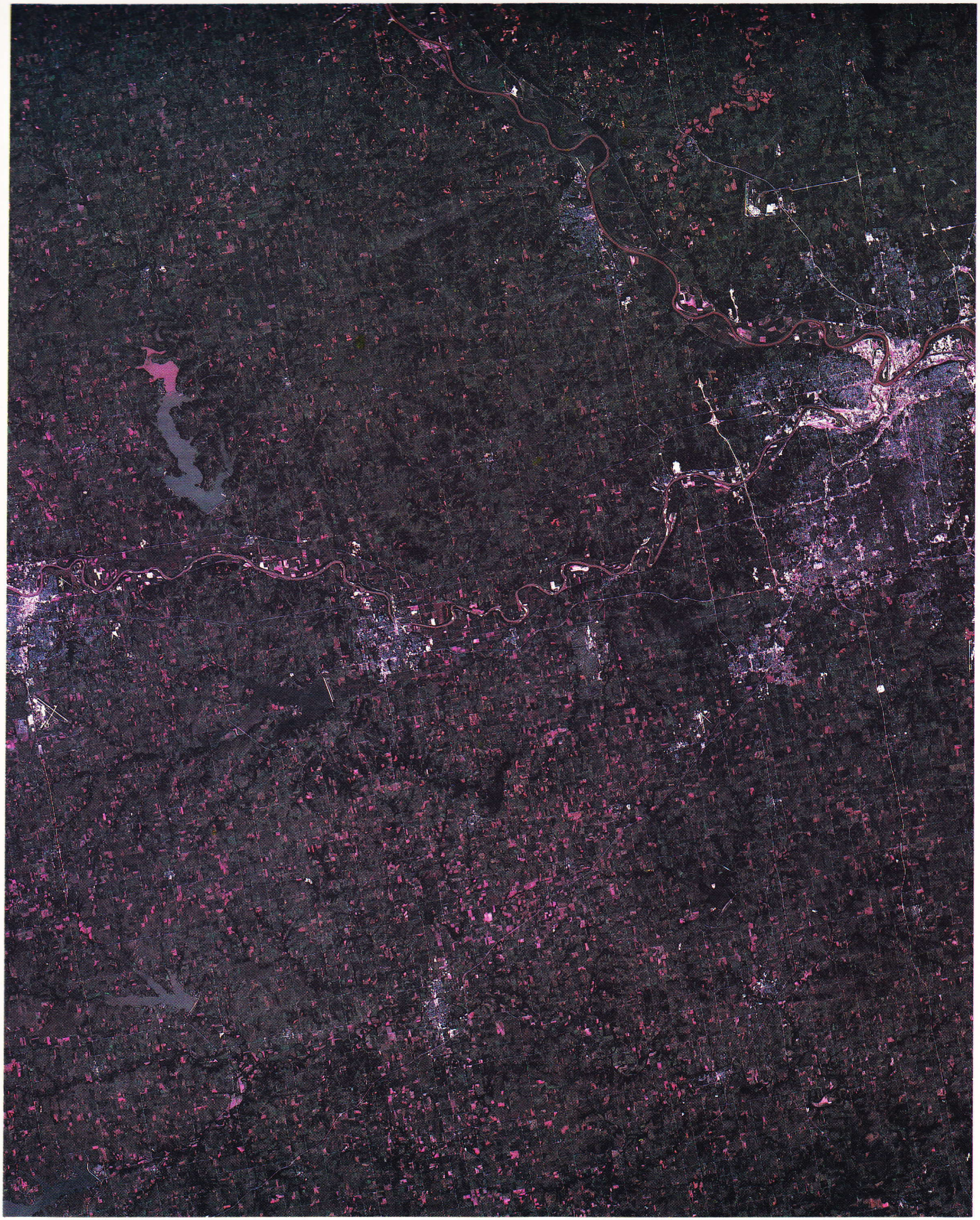

Kansas—Natural Color

This image is from the Thematic Mapper sensor on board the Landsat 4 satellite. This image was composed from the same set of satellite data as the matching false-color composite image of the same geographic area. This satellite image is a natural color composite. It represents the area with colors which approximate the natural colors of eastern Kansas during the season over which the data were collected.

Numerous similarities and differences can be noted between the two images. For example, the major lakes of the area are identifiable on the natural color image, but they are not as visible as on the false-color image. Information about water quality, however, is more evident on the natural color image as noted on the upper end of Perry Lake (the northern most of the three large lakes arranged north to south on the left side of the image). This large difference in color, from pink in the north to light blue-green in the southern portion of Perry Lake, indicates a large transition in water quality, possibly a result of surface turbidity (suspended sediments) or eutrophication (algae).

The urban areas of Kansas City, Lawrence, and Topeka (east to west near the center of the image) are equally evident on both the natural color and the false-color image. Also easily identified is Forbes Field Airport, directly south of Topeka, and the Kansas City Airport, northwest of Kansas City. On the natural color image, the urban areas take on a light purple color, while highways and roads appear light gray or white. Similarly, the major highway and the section line roads are also evident.

The major difference between the two images is in the ability to discriminate vegetation. Active agricultural areas and native grasslands have similar green tones on the natural color image. This is in stark contrast to the bright red (agriculture) to brown (native grasslands) colors exhibited on the false-color image of this same area. Because of the similarity in green colors denoting agriculture and grassland areas across the natural color image, accurate discrimination between these two major land cover types is extremely difficult, if not impossible. Fallow or open agricultural fields in the southern portion of the natural color image exhibit a light pink color and are easily distinguished. Likewise, forested areas are more easily distinguished by the darker, deeper green color on the natural color image. Small areas of forest can be seen northwest and just west of the Kansas City metropolitan area and as tiny fingers of dark green vegetation along the streams.

Note that the modern flood plains are more easily distinguishable on the false-color image. It is also interesting to note that the larger, older, urban areas visible on the image are located along the river courses.

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