

Another View On 35mm Slides For Mapping

The Spring 1987 issue of *Park Science* carried an article by Alison Teetor titled "Using 35mm Color Infrared Slides to Map Vegetation." A rosy picture was painted. However, anyone considering this method should be aware of additional information regarding comparison between 35mm slides and 9x9" photographs.

First, there is a question of scale. Teetor's cost figure for acquiring 3,500 color infrared (CIR) slides is \$87,000. These slides were acquired at a scale of about 1:45000 and projected, then interpreted, at a scale of 1:12000. The second estimate of \$23,488 is for 1,404 9x9" photos at a scale of 1:12000. At this scale, one is paying for better photogrammetric products and much more detailed information.

Comparisons should be made on the basis of acquiring similar data and at corresponding scales. If 9x9" photos were acquired at 1:46000 scale and the appropriate equipment used for interpreting them at 1:12000, their cost would be much reduced. An estimate for 9x9" CIR photos for park coverage at a scale of 1:46000 was given by a private firm as \$3,129. This cost assumed the use of a small plane, which could fly only high enough to use a 3 1/2" lens. A 6" lens is preferable for mapping purposes. Based on estimates of three times the aircraft cost for larger planes (A. Roberts, L. Griswold, 1986), we get \$9,387. This is comparable to the \$8,700 for the 3,500 35mm slides — figures shown in Table 1.

Secondly, cost comparisons should include staff time. Simply examining the numbers of images gives a clue to the mapping time required. To cover the stereoscopic view area of one pair of 9x9" photos requires 150 35mm photos (A. Roberts, L. Griswold, 1986). Thus, where Teetor used 3,500 35mm slides, only about 149 9x9" photos would be required.

Organizing and transferring to a base map 3,500 images is more time consuming. The vegetation mapping time per image could be much less with 35mm slides, but the total mapping time, accounting for edge matching and scale distortion problems, would be considerably more. The Shenandoah project began in 1983 and is slated for completion in May 1987; about half the photointerpreted stands need to be visited on the ground . . . a staff time commitment.

A third limitation of the 35mm slide method is the difficulty of projecting the slides onto the base map. A 1:46000 scale 35mm slide image projected onto a 1:12000 scale map covers an area approximately 5x7". If one uses only the central 65 percent of the slide (to avoid extensive scale distortion), the useful area is about 4x5.5". Within this area one aligns the image with the map, matches the edges of previously interpreted areas with the area to be interpreted from the current slide, and adjusts the scale at which the slides are projected. With large expanses of natural vegetation, topography becomes the primary alignment clue.

Anyone who has done such work realizes that 4x5.5" of a 1:12000 scale map (originally 1:24000, but photographically enlarged to 1:12000), is not much area. In contrast, the central 65 percent of a 9x9" 1:46000 scale photograph enlarged to 1:12000 scale covers a 28x28" area.

Also, the use of a projector to enlarge and register a slide to a map prohibits stereo viewing. Use of a

Table 1. Cost comparison for obtaining CIR imagery for Shenandoah National Park, VA.

Imagery format	35mm	9x9 inch	9x9 inch	9x9 inch
Scale	1:46000	1:46000 (3" lens)	1:46000 (6" lens)	1:12000
No. of photos	3500	149	149	1404
No. of flight lines	more than 10	3	3	10
Cost	\$8,700.00	\$3,129.00	\$9,387.00	\$23,488.00

stereo-zoom transfer scope with 9x9" photos allows stereo viewing and greatly enhances the accuracy of image alignment with the topo map.

In summary, when comparing costs of 35mm slide mapping vs. 9x9" photos, one should (1) compare the costs of acquiring imagery at the same scale, (2) weigh the difference in staff time required, and (3) consider differences in accurately interpreting and transferring the information to a base map. A useful rule of thumb might be to use 9x9" photography except when mapping small areas or doing reconnaissance work.

Literature Cited

Roberts, A. and L. Griswold 1987. Practical photogrammetry from 35mm aerial photography. Photogrammetric Engineering & Remote Sensing 52(4):501-508.

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