FOREST CANOPY HEALTH: DEVELOPMENT OF A STANDARD METHOD FOR LONG-TERM MONITORING AND EVALUATION

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OBJECTIVES

Forest canopy assessments related to tree health have historically been obtained by visual

METHODS

Using a 35mm camera with a 17mm wide angle lens, Ektachrome slides (ISO200) were taken

1. North American Maple Project (NAMP) 014, Proctor Maple Research Center (PMRC) in Underhill - 45 points.

2. Forest Health Monitoring (FHM) 2 at PMRC - 32 points.

3. Forest Health Monitoring 4 at Underhill State Park - 32 points.

Photo points were arrayed 10 m apart on the NAMP grid for each subplot, and were at a

In order to evaluate the performance of this system for characterizing softwood canopies, a

Photography:

No weather criterion was applied, except to avoid rain and excessive breeze. The objective has

The camera was mounted on the tripod with the lens oriented toward the zenith. For

Camera height was 1 m from the base of the stake to the optical center of the lens (about 2

The camera was equipped with a right-angle viewfinder and a cable release.

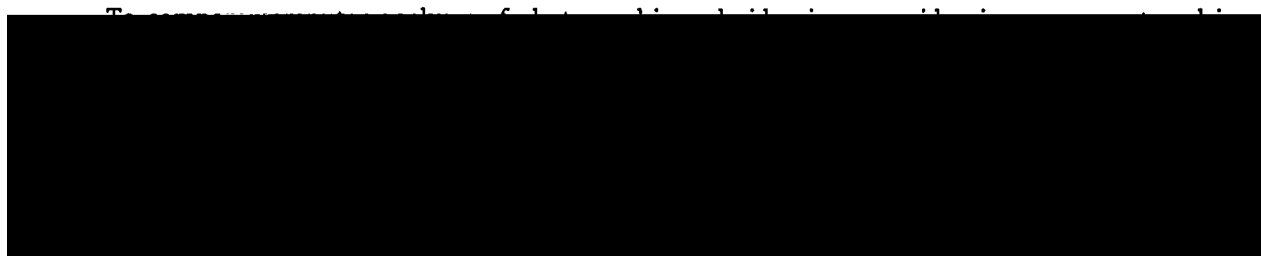All foliage up to 1 m from the camera lens was removed in an arc containing the image. This

After set-up was complete, three exposures were taken: one at the camera meter's setting, one
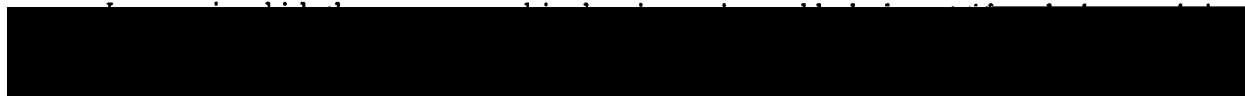
Complete notes were taken for each set of exposures, including photo point ID, time of day, an

Video:

Techniques described for setup and placement of the 35mm camera above each point were also

Image Analysis

In order to develop a scoring procedure for canopy cover on the slides, we compared a

Slide Grid Projection:

A radial grid was drawn on white paper to include 144 intersections formed by 12 concentric

Each slide was read with a set routine, scoring intersections on successive circles beginning

Scoring time with the manual/visual system varies according to crown density, with the less

Swathkit:

The Swathkit imaging analysis/enhancement system, was used in development of

Photography: it was desirable to remove the B&W video camera from the Swathkit "blue box"

Using the striped test pattern, which is slightly less than 50 percent black on white, the
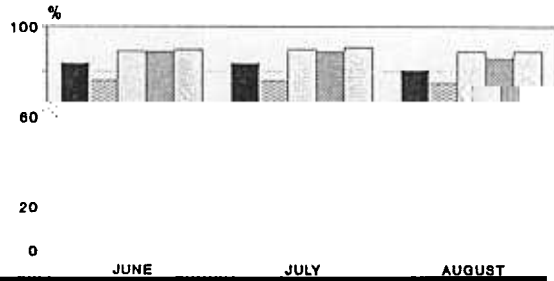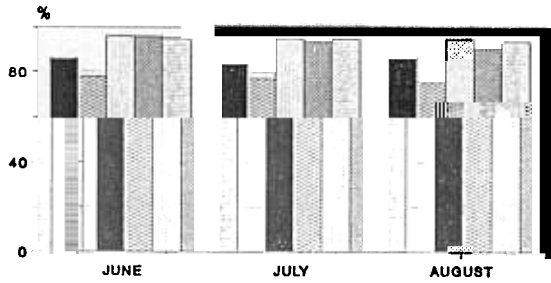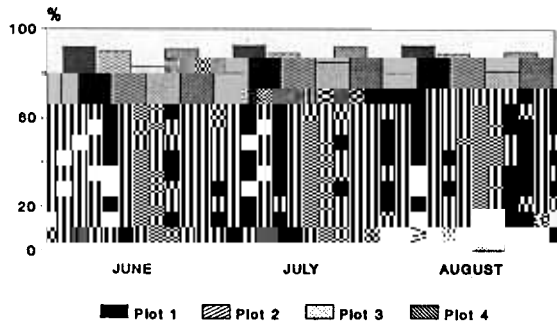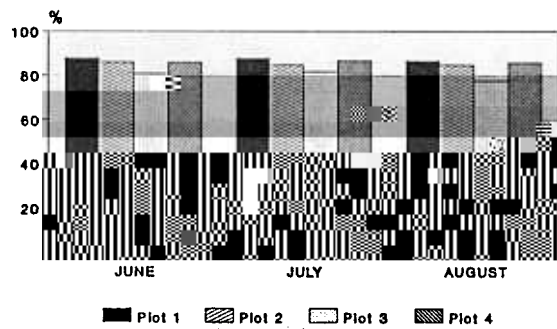
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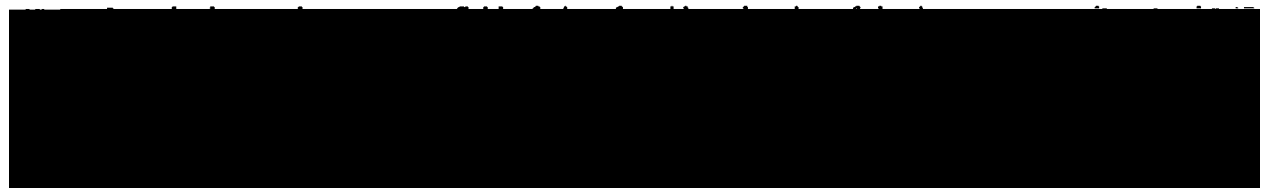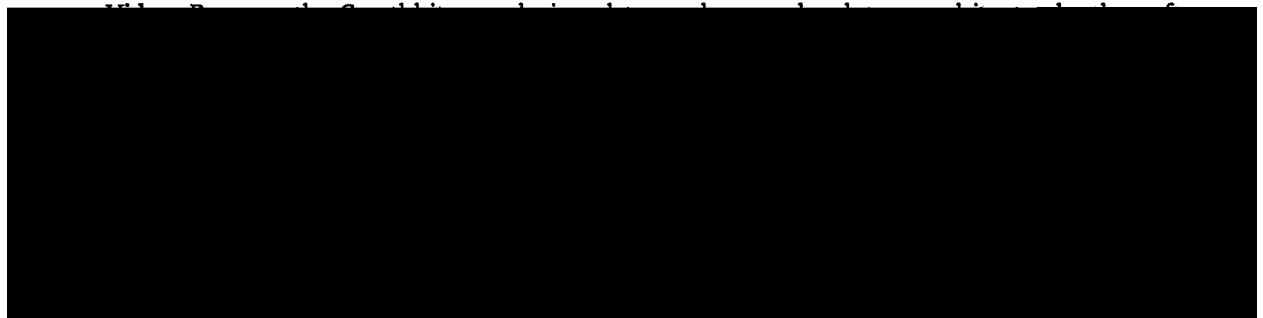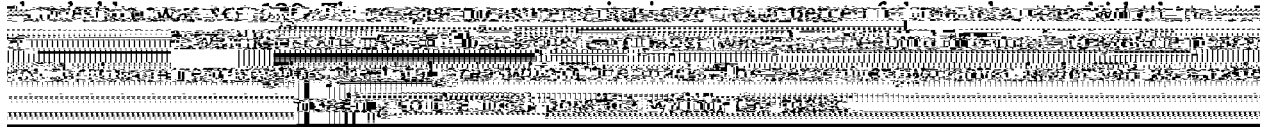
Photography:

Figure 1. Percent Canopy Cover in 1991 for the NAMP Plot at Proctor Maple Research Center Based on Two Analysis Methods.

Based on slide grid projection
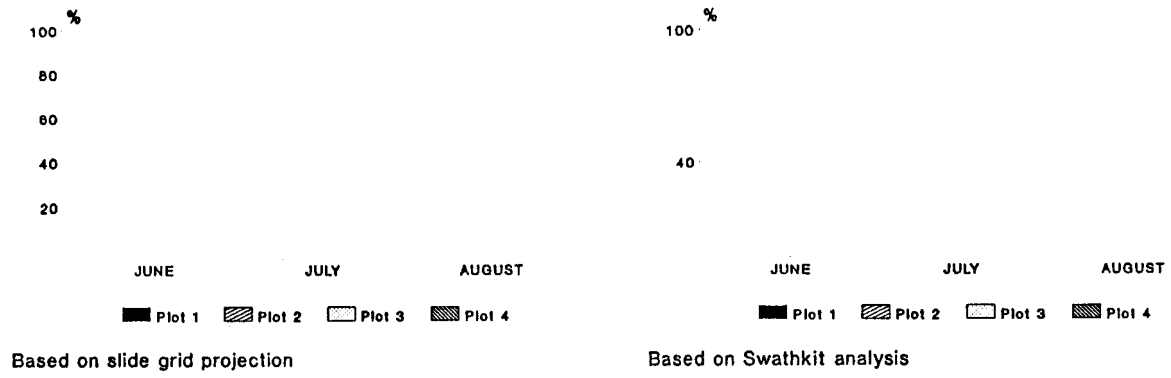
Based on Swathkit analysis

Figure 2. Percent Canopy Cover in 1991 for the FHM Plot at Proctor Maple Research

Based on slide grid projection

Based on Swathkit analysis

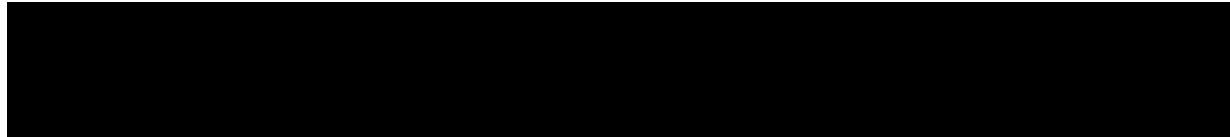Figure 3. Percent Canopy Cover in 1991 for the FHM Plot at Underhill State

The trial in the red pine plantation, in which the nine photo point transect was traversed four

The Swathkit analysis appears to be quite sensitive in detecting small changes in canopy cover
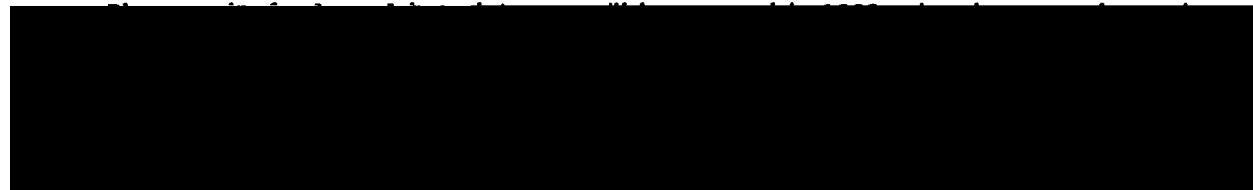
vantage of the grid projection system over image analysis is the ability to compare   One adv

Video:

Photographic transparencies can be easily modified with filters, masks, etc. in the analysis

FUTURE PLANS

Light sensors such as the LiCor Plant Canopy Analyzer and Sunfleck PAR Ceptometer are now

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REFERENCES

Fargione, Michael J. 1985, an estimation procedure for determining canopy densities from