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REPORT OF THE FORESTRY SECTION:

WORKING GROUP ON VEGETATION DAMAGE

ABSTRACT

The report of the forestry section of the vegetation working group is presented. Activities since the last Congress are briefly reviewed. Current activities are discussed. Problem areas requiring further work are defined and recommendations for delegate consideration are presented.

The Past Four Years

Since the last I.S.P. Congress in Helsinki, several important events relative to vegetation damage detection and assessment using remote sensing technology have transpired. A symposium on the use of remote sensing for vegetation damage assessment was held in Seattle, Washington, U.S.A. In Europe, an international experiment was organized to evaluate multispectral techniques for vegetation damage assessment. Thirdly, there has been increased research in, and technology application of remote sensing for vegetation damage detection and assessment, and these new results should be put quickly into the system.

The Symposium in Remote Sensing for Vegetation Damage

The symposium was held in Seattle, Washington, February 14-16, 1978. Approximately 100 participants listened to four invited and 27 presented papers. The topics of discussion dealt with:

- i) the theory of vegetation damage detection and assessment;
- ii) current and future technologies;
- iii) case studies, and
- iv) economics and current applications.

The four invited papers were subsequently published in the September, 1978 issue (Vol. 44, No. 9) of the American Society of Photogrammetry's "Photogrammetric Engineering and Remote Sensing". The Proceedings of the Symposium are available from the American Society of Photogrammetry (A.S.P.) (105 N. Virginia Ave., Falls Church, VA 22046, U.S.A.). The participants discussed and voted upon several resolutions at the meeting. The resolutions asked for:

- i) A.S.P. and I.S.P. Comm. VII support and encouragement of research into further investigation of the relationship of vegetation physiological functioning to remote sensing data;
- ii) an international study on previsual or extravisual damage detection;
- iii) more precise definitions of damage and damage classes;
- iv) coding of forest damage types in chronic vegetation damage situations;
- v) quality control through use of defined confidence levels and statements of errors or estimates, and
- v) more effective technology information transfer at symposia and government or institutionally-sponsored local-area workshops.

The resolutions presented at the symposium were discussed in a paper by Murtha (1978) and were brought to the attention of I.S.P.-Comm. VII participants at the 1978 Freiburg Symposium. In the two years since the Seattle meeting, there has been some activity on the subjects the resolutions were concerned with. However, there are still needs to be looked after.

For example, the first two resolutions dealt with the relation between aspects of plant physiology and remote sensing. More specifically, the relationships between changes in plant physiology (i.e. cellular functioning) and spectral reflectances or emittances relative to vegetation injury and the data subsequently recorded by remote sensing needs to be assessed. There is still a need for base-line studies in spectral reflectance, coupled with comparative studies of stressed plants. These data are required in order to make more informed interpretations of remote sensing data.

One of the major problems revolves around the fact that "remote sensors" spend too much time talking with other remote sensors and not enough time talking to disciplin-oriented groups. Even working-group meetings at other professional congresses tend to attract only select groups of professionals. The remote sensing papers need to be worked into the regular programming, thus exposing a wider range of other professionals to the remote sensing technology. Additionally, the remote sensing person needs to involve themselves in activities which promote the technology transfer phase. Such activities would include attendance at meetings, as well as working directly with individuals concerned with the problem, and teaching them the techniques involved. Or, at least, attempting to promote in the other professional a level of understanding about remote sensing that would provide for the use of the new technology. Promoting such understanding would reduce the credibility gap.

The European Experiment in Vegetation Damage

Working Group V of the European Association of Remote Sensing Laboratories which deals with the Application of Multispectral Remote Sensing Systems for Agriculture and Forestry under the chairmanship of Mr. P. Reichert, of the University of Freiburg, held a meeting at Hinterzarten, Fed. Rep. Germany, to discuss a remote sensing project concerning vegetation damage detection and assessment in Forestry and Agriculture. The experiment is being discussed during this Congress at the Main Comm. VII, WG-2 meeting with translation by Mr. P. Reichert, and Dr. E. Sanwald. However, the significance is such that it should be mentioned here. The experiment in part responds to the second resolution of the Seattle symposium which called for an international experiment in vegetation damage detection and assessment. However, the European experiment goes much further,

and we look forward to hearing the results. In essence, two crops (one in Forestry and one in Agriculture) will be studied by multispectral systems and the experiment will have a replicated experimental design and a standardized ground truth methodology. Independent teams of scientists will be working at each of the chosen sites. The results of the experiment should add tremendously to our knowledge of remote sensing for vegetation damage, and increase the credibility of remote sensing results.

The Davis Meeting

A meeting on vegetation damage assessment was held at Davis, California, May 15-17, 1979, in conjunction with the 7th Biennial Workshop, Air Color Photography in the Plant Sciences and Related Fields. The meeting is discussed in detail on pages 161-164, of the Proceedings, which were also published by the Amer. Soc. Photogrammetry. It was the consensus of the participants, that, in view of the concern for technology transfer relative to remote sensing for vegetation damage assessment, a valuable reference would be an updated version of an annotated bibliography on remote sensing for vegetation damage assessment. Useful remote sensing and photo interpretation techniques should be considered as well as reporting successful case applications. If error estimates are given with the reports, they should be included as part of the annotations. Applications which have given poor results should be included, if only to pin-point pitfalls which can be avoided in future work. The Davis meeting not only highlighted the interest in remote sensing for vegetation damage detection and assessment, but also provided a forum for a series of papers on new techniques for and studies of vegetation damage.

Summary and Recommendations

Vegetation damage detection and assessment continues to be an active area in remote sensing. Advances continue to be made, but some problems need attention:

- I. Since there is still a need for base-line studies investigating the relationship between aspects of plant physiology and spectral reflectance or emittance, be it resolved that:

"I.S.P. Comm. VII, WG-2 supports the concept of and encourages research institutions to become involved in in-depth basic studies between normal and stressed plants relative to spectral reflectance and emittance, and to relate the data to remote sensing systems (both aerial photographic and multispectral digital systems)."

- II. Since there is a continuing need for quick access to annotated literature, be it resolved that: "I.S.P. Comm. VII-2 support and encourage the further publication of updated annotated bibliographies dealing with remote sensing for vegetation damage detection and assessment", and
- III. Since technology transfer has become a concern for many agencies, and since vegetation damage detection and assessment is an important aspect of environmental monitoring, be it resolved that: "Working Group VII-2 continue to function as an activity of Comm. VII., I.S.P."

Finally, since technology transfer continues to be an important item for remote sensing professionals, that each individual involved in vegetation techniques not only use the most apt scientific methodology but also attempt

to inform the public or bring about a level of understanding in the public that will facilitate the use and increase the acceptance of remote sensing.

Literature Cited

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