VI. Land Use State and Local Users

Charles M. Parrish, III[a]

The state and local and land use sessions discussed in this summary involved a cross section of the expanding community of government managers who are now using remotely sensed information to make programmatic decisions. In this summary, the specific applications discussed in individual presentations are not itemized; these are available in Volumes I and II of the proceedings. Instead, problems and potential solutions that can be inferred from the presentations and resulting discussion are addressed.

The objective of the state and local interactive session was to compare approaches to remote-sensing applications for state and local resource management problems. With the possible exception of some international papers, this objective applied equally to the land use session; however, the land use session differed because of less time for discussion and consisted primarily of several presentations emphasizing techniques.

Mr. Charles Mathews has personally requested emphasis on problems that NASA should be addressing. In responding to that request, I have included other Federal agencies and, wherever possible, have suggested directions for future program development.

Many papers throughout the symposium related to state and local applications. Those included in the two sessions summarized herein were selected to provide material for stimulating interaction and thereby for emphasizing as many of the generic issues as possible. Hopefully, the audience of state and local managers furthered their appreciation of the status and direction of remote sensing as a useful tool for problem solving.

Many current applications of remotely sensed data to management problems exist, and some have been used for years. However, the papers presented dealt with some of the more complex approaches, simply because people believed discussion of such approaches was appropriate. Among the general categories of major applications discussed were wildlife habitat determination; crop production estimation; impounded water surveying; urban development monitoring; corridor location (transportation, communication, energy); flood area definition (fig. VI-1); urban planning; agricultural potential determination; surface water runoff estimation; water quality determination; strip-mine rehabilitation monitoring; coastal zone baseline information surveying; significant natural resource area definition; and forest management planning.

Interest in the use of satellite-acquired data was greatest among users concerned with large areas. In general, the strongest interest was shown by users from the larger states, which often encompass large tracts of relatively inaccessible land.

The use of imagery still is more common than the use of digital data. However, interest in the use of digital data and of computer implementation information-extraction techniques is increasing rapidly.

In general, aerial photography is widely used as a source of information, but it provides only a part of all information desirable for decisionmaking. Even though much remotely sensed data is being acquired, uncoordinated acquisition by various projects at various levels and scales sometimes precludes the use of these data for comprehensive statewide inventory. Yet there is considerable interest in the initiation of statewide information systems.

The most striking characteristic of the international presentations was that most projects use the satellite-acquired data in an operational context because these are often the only data available. However, in some cases, satellite data coverage is still less than adequate.

For the urban orientation, there were not enough participants to obtain a representative cross section of

[a]Georgia Department of Natural Resources, Atlanta, Georgia.

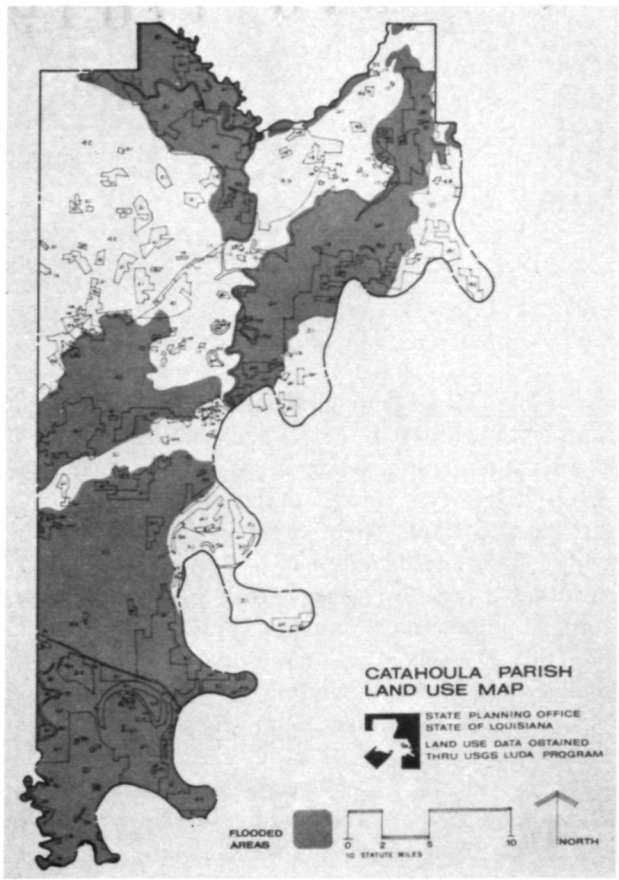

Figure VI-1.– An example of satellite data used to map flooded areas in a county. The dark areas, interpreted from Landsat imagery, were overlaid on an existing land use map.

urban users who apply remotely sensed data. The statements and conclusions made in this section are based on what was heard.

Urban planning has been identified as a major area of application of remotely sensed data. As in past years, low-altitude aircraft photography currently is the predominant source of remote-sensing data used in the planning process. However, many planning groups still use conventional ground data-gathering methods. Much of the photography collected is in the range of scales from 1:2000 to 1:24 000 and provides adequate detailed information (Levels III and IV) for most urban planning functions.

During the past 5 years, some urban planners have had access to NASA high-altitude aircraft photography at scales from 1:100 000 to 1:125 000. Most evaluations of these data indicate that the detail is insufficient and that the scale is too small for many planning purposes, particularly those dealing with urban cores and adjacent areas; however, the data do have potential in planning for those areas near and beyond the urban fringe (fig. VI-2). Although Landsat data cannot provide the detailed information and mapping required for most urban planning purposes, the imagery is potentially useful in applications of digital processing techniques to monitor suburban expansion and to provide change detection throughout the urban/suburban area.

As planning becomes large scale (beyond the urban fringe), it may be wise to compare the advantages of obtaining a land cover inventory from a satellite source such as Landsat to obtaining it by the traditional technique of aerial photointerpretation or field survey. The advantages are measured not only in dollars saved, but, more important, in time saved. (Three examples of this consideration were given within the session.)

The author drew a few general conclusions from the proceedings. First, a tremendous gap exists between the technical development and the managerial application of remotely sensed information. However, a number of people were surprised at the extent to which remote sensing is being actively applied by state and local government agencies. There is apparently a rather rapid expansion in its use across the country. Some recommendations are made in the following paragraphs.

1. The NASA and other Federal agencies, as well as state agencies, are becoming more conscious of the user and his needs. Although this progress is healthy, educational programs should receive an even higher priority. Formal education programs, developed and sponsored by Federal agencies and made available to state and local governments, are extremely important.

2. Documented procedures directing the user from the first step to the final product are essential. Without a formal approach, a new technique will appear excessively risky to most users. All successful applications research should culminate in a formal procedure.

3. Symposia, conferences, and briefings are necessary to make the manager aware of the state of the art, but these meetings must have direct followup assistance in technology transfer. The concept of cooperative remote-sensing centers was discussed, but no consensus on their function was apparent.

4. Research projects as funded, together with their primary objectives, should emphasize the involvement of students who one day will be in operational programs trying to resolve resource management problems.

5. The simple technique should not be neglected. Often, a sophisticated approach is used when a proven

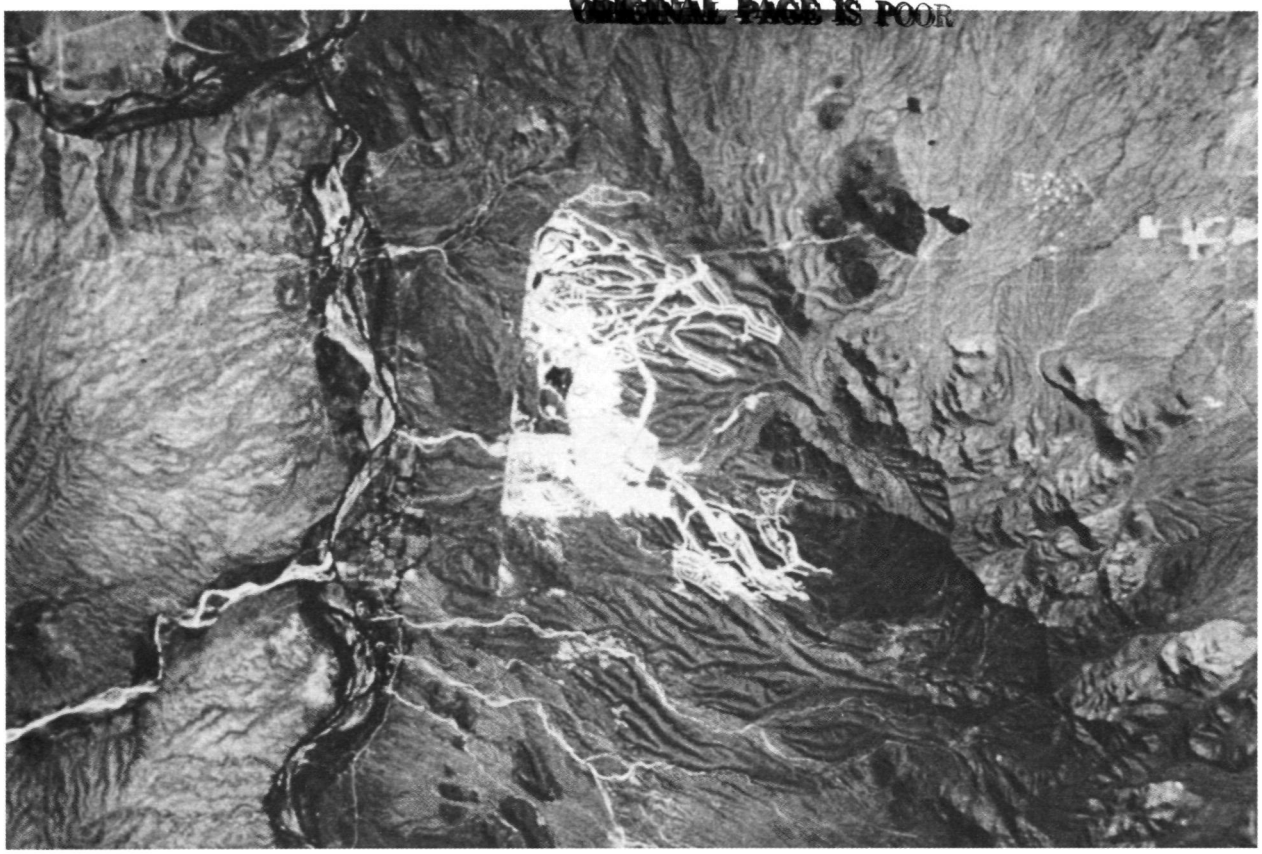

Figure VI-2.– Trends and residential growth in outlying subdivisions are visible in this small-scale photograph.

simpler method may be equally effective. More complex approaches should be applied only as they are proved and as management problems require their application.

6. As much for education as for improving solutions, the intended user should participate in the design of data acquisition and handling systems. If the user works on system development and understands system operation, he will be able to use the system better.

Second, the user must be confident that the operational system will have guaranteed continuity of service. Many are using Landsat data routinely now, but because the system is not classified as operational, any large commitments to training, technology, and equipment would be very risky. If one concentrates on the established capabilities of Landsat and evaluates those in relation to specific problems, he will recognize that Landsat should be an operational system.

Third, the fact that no single system will ever be a panacea must be recognized. A collection of tools specific to the particular problems dealt with by managers is needed. Such combinations as spacecraft and aircraft, digital and optical will be necessary for a long time.

Fourth, data must be made available to users at a high resolution, with a quick turnaround, at a low cost, and in a rectified form. There was much interest in greater resolution and more rapid data delivery, but it was recognized that a tradeoff exists between the two, with cost the ultimate limiting factor. Rectified data referenced to the ground and to a nominal scene with sufficient accuracy and available in volume from the EROS Data Center would greatly increase the usefulness and affordability of the information. Rectification is the main requirement to geographically reference information extracted from remotely sensed data to other physical and socioeconomic information.

It must be remembered that in any remote-sensing technique the data need only have accuracy or precision to the degree required by its application. Such information often becomes acceptable when it is of a quality equal to or better than information assembled by existing operational ground surveys.

Fifth, cooperative programs should be developed. If states share the cost, the data probably will be worth collecting. The states will also have more involvement in the manner of collection and the type of format chosen.

Sixth, more personal communication is needed among data users and between data suppliers and users. A consensus approach to management should be developed. During the state and local session, there was only minimal attendance and involvement from local governments. State governments were better represented. However, most of the time, the person who actually makes the final decisions is probably in local government.

Seventh, users must be encouraged to help develop future programs. To this end, a structured effort by the Federal government is needed. This conference has gone a long way, and other efforts have been made in recent months and years. These efforts must be continued. Of course, participants in the session did recognize that state and local governments, the ultimate users, share the responsibility of defining their own needs and expressing them to the Federal government and thereby aiding in the development of programs. Although the sessions identified many of the basic problems that need to be resolved in developing future programs, nothing should prevent users from going ahead and applying the data that now exist to management needs. Existing data can go far toward solving problems today. At the same time, users should work together in a structured, focused, and intensive manner to define the needs of future programs.