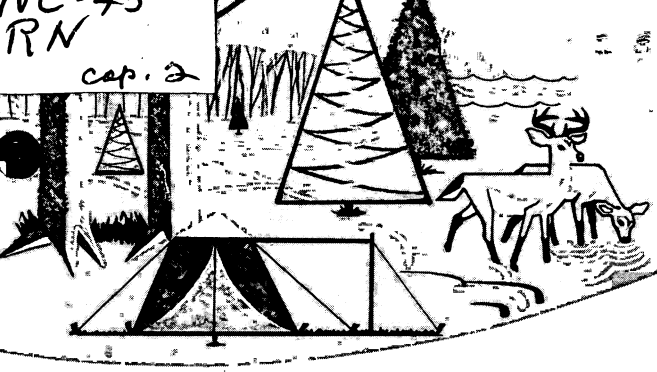

RESEARCH NOTE NC-45

NORTH CENTRAL FOREST EXPERIMENT STATION, FOREST SERVICE—U.S. DEPARTMENT OF AGRICULTURE
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A Computer Program for Displaying Forest Survey Type Information

ABSTRACT.—Presents a computerized procedure for displaying forest type information from inventory plots. Although the development of general forest type maps is emphasized, the program can be used to display any locational data having rectangular coordinates.

Forest type maps of large areas are generally made from aerial photographs by skilled photo-interpreters. This method is fast, efficient, and fairly low in cost. However, photo quality and the skill of photo-interpreters vary, and some forest types change between the time of photo-flight and mapping. Therefore, forest type information collected by field crews would generally provide a more accurate type map.

For this reason, a computer program to display forest type data collected by field crews has been written. Although the use of a computer as a mapping aid is not a new idea,[1] this program is unique in that it locates plots so that the computer run can easily be used by Forest Survey in developing general forest type maps.

Description of Program

Program AUTOMAP (Automatic Mapper) operates on the rectangular coordinate system used to identify all Forest Survey plots.[2] Each plot is identified by specifying its section number, township, range, and principal meridian; and the forest type is identified by a standard two-digit numeric code. A punched card containing this information is entered into the computer and located to the nearest quarter township. The program internally converts each numeric code into a single alphabetic character code which is displayed on the printed page. A single page of output represents 10 ranges in width (60 miles) and 8 townships in length (48 miles).

Prior to processing, the cards must be ordered from the most northwestern township and range to the most southeastern township and range referenced by a particular principal meridian. Plots referenced by different principal meridians must be processed separately.

Program AUTOMAP is written in Fortran IV (E Level) for an IBM 360/30. Input to

[1] *For additional references on automatic mapping techniques, see two papers by E. Amidon published by the Pacific Southwest Forest and Range Experiment Station: A computer-oriented system for assembling and displaying land management information, U.S. Forest Serv. Res. Pap. PSW-17, 34 pp., 1964; and MIADS2—An alphanumeric map information assembly and display system for a large computer, U.S. Forest Serv. Res. Pap. PSW-38, 12 pp., 1966.*

[2] *A description of the rectangular coordinate system can be found in the Manual of Instructions for the Survey of the Public Lands of the United States issued by the General Land Office of the Department of the Interior in 1939, and revised in 1947 by the Bureau of Land Management. The system is applicable in most of the United States.*

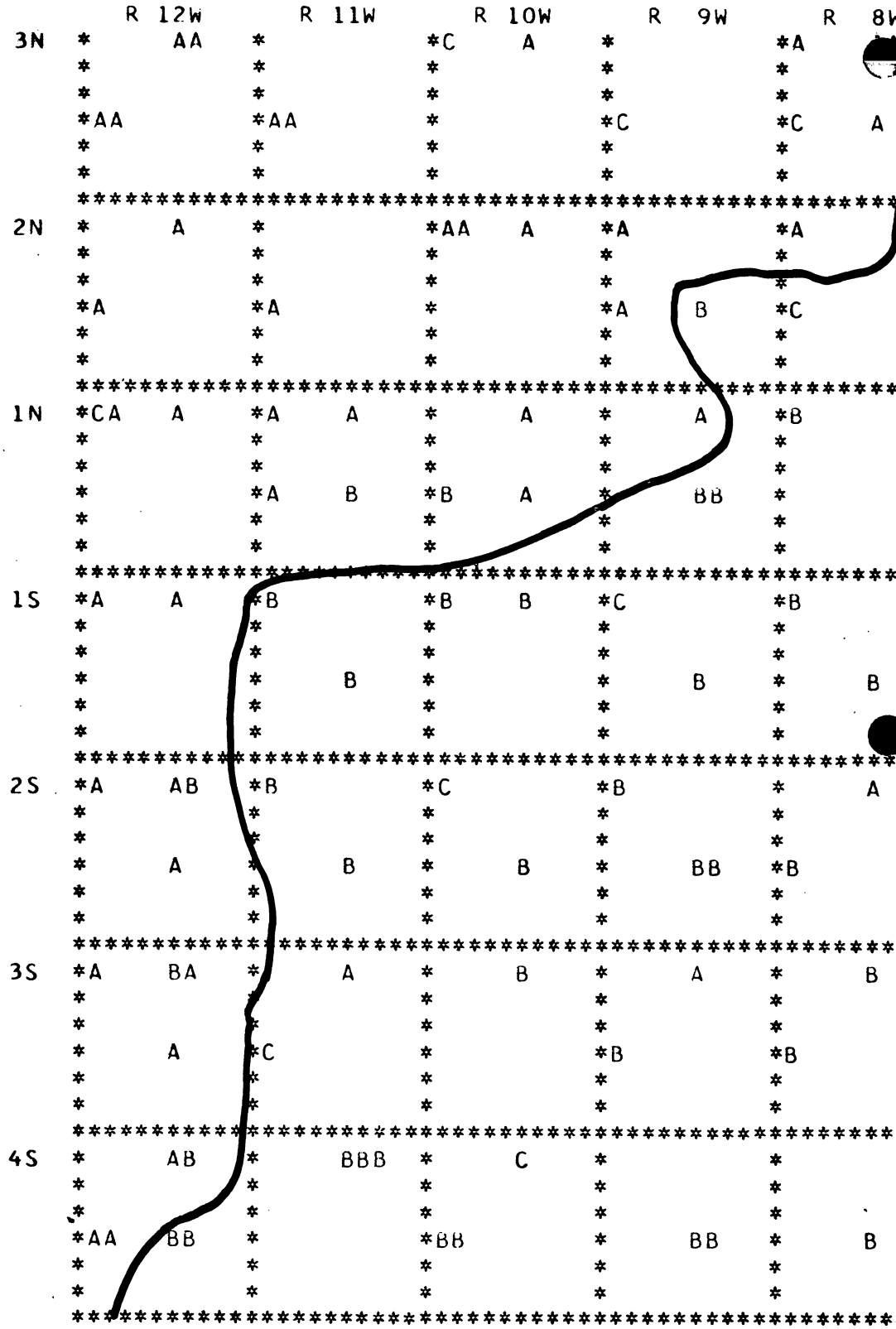
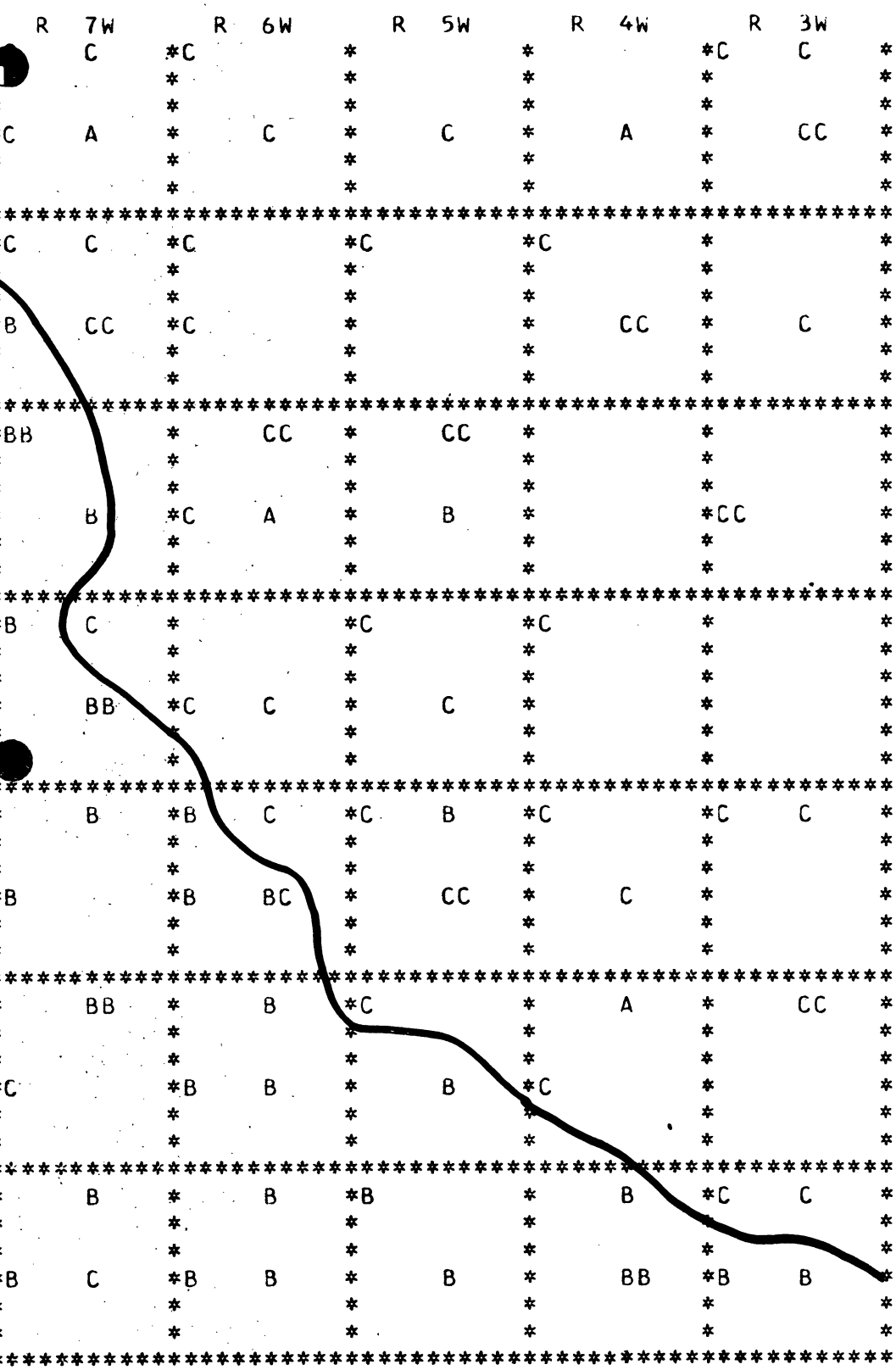


Figure 1.—Computer output showing the location and forest type of 175 plots. A table (not shown here) of the internal numeric and external alphabetic coding schemes is printed at the beginning of



each computer run. The codes shown here are: *A*, pine type; *B*, spruce-fir type; and *C*, aspen-birch type. The lines separating the three general types are hand-drawn.

the computer is on standard 80-column cards, and all output is printed on a line printer. No tape units or other peripheral devices are needed.

Example

An area extending from range 12W to 3W and from township 3N to 4S provides an example. A field crew has measured 175 sample plots. The necessary control cards are prepared,[3] and the plot cards prepared, sorted, and run. The forest type codes used are as follows:

Type	*Numeric and aphabetic codes*	
Pine		
White pine	03)	
Red pine	02)	A
Jack pine	01)	
Spruce-fir		
White spruce	16)	
Black spruce	12)	B
Balsam fir	11)	
Aspen-birch		
Aspen	91)	
Birch	92)	C

[3] *A source deck listing and instructions for setting up the control cards and for making the sort can be obtained from the Station.*

The sample output shown in figure 1 illustrates several important items. The townships are separated from each other by lines of asterisks to make the display more readable. Each township is divided into quarters, and seven lines of the computer output are allotted to each township. The forest type code of any plot or plots in the township appears on either the first or fourth line. For instance, township R3W - T4S has four plots in it, one in each quarter-township. The forest type lines are drawn in by hand on the computer output. This example, of course, is an extremely small-scale representation of reality. Normally the Forest Survey measures several thousand plots in each state. To display these plots by hand would be most time consuming.

Possible Applications

Throughout the development of AUTOMAP, the principal goal was to provide a method for displaying forest type data collected by field crews. However, AUTOMAP can be used for other purposes. For example, survey plots with a certain volume, basal area, cutting priority, or site quality can be displayed. In fact, any data can be displayed, so long as the rectangular coordinates of the different locations are known.

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