

The Mechanics of Cover Type Mapping

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Mapping and the ability to interpret maps are among the most important phases of ecological surveys, grazing surveys, or any land management survey. Maps are essential in the study of wildlife and in making and carrying out management plans. Maps provide a permanent record depicting a large body of useful information in a form that is readily comprehended. A range map is of great importance in administration and indispensable to a complete range management plan. Even the manager who has never seen the land can obtain from the map information on range adaptation such as season of use, potential productivity, and kind of livestock.

Ecological, grazing, land use, and wildlife management maps always show vegetation types. A type is not a distinct unit and may be delimited on the basis of aspect, composition, or density. Vegetative, or cover type mapping on a regional or widespread scale is by aspect. On small areas, or limited scale, composition and/or density are of significance.

As a background for determination of original vegetative cover, it is necessary for the worker to review as many as possible of the historical accounts written by early travelers within the region under consideration. As examples, in the central portion of the United States, many early explorers were competent botanists and collected specimens to be later identified. For Oklahoma, the journals and reports of such men as Nuttall, Marcy, Tixier, Gregg, Irving, Latrobe, Whipple, Cooper, Aldrich, and Bonneville and the information contained in the Railroad Survey contribute much to the knowledge of early or original vegetation. Recent work by collectors must be reviewed to round out a general knowledge of the region.

In the preparation of a cover type map, first consideration is a base map from and on which to work. In as much as the ecologist, the range manager, the forest manager, or the wildlife worker is concerned primarily with vegetation, and, generally, is only slightly if at all trained in cartographic techniques, much time would be lost if he had to prepare a base map showing topography, natural and cultural features, and other details necessary in orientation. On a county or statewide basis the task would be impossible. If the area to be mapped is of more than a square mile or so in extent, a base map should be acquired. For very small-area maps, aerial photo tracings, plane table, pace/chain, or ocular surveys may be made on a base map drawn to convenient scale.

This paper, however, is concerned with large-area or state-wide cover type mapping. For state-wide cover type mapping there are usable and accurate base maps in various scales and sizes which have been prepared by more competent cartographers than the usual field worker.

Of prime consideration in the selection of a base map is accuracy in drawing and reproduction, and scale. The scale must be of a size on which the worker can, without crowding or confusion, delimit the various types. It must be small enough to be conveniently handled. The size of the completed map depends on the needs of the observer. Though a wall map may be of any size, for convenience it should not exceed four or five feet in any one measurement. Field maps, on the other hand, must be of a size that can be handled during the course of observations. The most convenient size is 8½ by 11 inches, requiring the worker to map in parts and transcribe data to the base map in the office. For field survey it is convenient to use the standard section or township plat (eg. Manly Form 75 or 87). Use of these forms require constant orientation while in the field.

For ease of recognition and orientation political boundaries are more acceptable than natural boundaries. For this reason a political subdivision may well be chosen as the base map.

In specialized regions, such as a National Forest, base maps are supplied by the Cartographic Section of the organization. In most States the highway department is the source of base maps, although at times it is best to use Geological Survey or Coast and Geodetic Survey maps as bases. These latter are especially useful if it is wished to show topography, but are sometimes difficult for the uninitiated to correlate with state maps.

After scope and scale of the map is determined and a suitable base map is acquired, it is necessary to adopt or devise the symbols required to designate the vegetative types likely to be encountered. Although symbols denoting topographic and some other features are reasonably standardized, cover type symbols, due probably to the immense diversity of plant communities, are at the mercy of each organization concerned with them. As examples, the Grazing Service recognizes 18 major types and many subtypes, while the American Society of Foresters have 97 types based on aspect and composition. Symbols must be as brief as possible yet detailed enough to enable one to express essential characteristics.

Access should be had to topographic and soil maps and aerial photos of the region. The topographic and soil maps are useful in delimiting the original vegetation. The most useful of the aerial photos is the mosaic. In preparing the mosaic, only the center portion of each photograph is used. By orientating the parts by features duplicated in overlapping, a small-scale, wide-area photographic map is obtained. From the photograph one can obtain a quantitative delimiting of forest, savanna, prairie, and other features. Only after much experience, however, can a worker differentiate in a qualitative manner. By transferring these data from photographs and correlating delimiting factors with topographic and soil maps, the base map is roughed out. In wide-area mapping cultivated areas are ignored if the aim is to depict native vegetation. The lines of forest and prairie are smoothed to conform with topography and soils.

As the map is roughed out, the field work begins. Here, one will find the County transportation maps very useful. In this phase of the work the observer must follow a systematic and carefully planned route of survey. Careful speedometer mileage is kept. As much of the region must be traversed as is physically possible within the time allowed. In open country rapid progress can be made but in wooded or broken country care must be taken to keep oneself oriented. Type and composition of roadside cover must be identified with certainty and distances measured as accurately as the speedometer will allow. If the observer uses section or township plats for field data, constant and positive location must be maintained. The data should be transcribed to the base map immediately upon return from the field.

When the base maps have been completed, and all data necessary for delimiting the vegetative cover inscribed, it is usually desirable to compile the base maps into a state or regional map. In reduction of scale some detail will be lost but a usable map, of a size which can be handled, can be reproduced. For public distribution reproduction in color or color/hatching is desirable.