# Management Applications of Biotic Community Data

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The need to summarize and map plant and animal information received new emphasis in the 1970's with a number of environmental laws enacted by Congress—the National Environmental Policy Act, National Forest Management Act, Endangered Species Act, and Resources Planning Act. These laws are forcing a systematic approach to land use planning through resource inventory and assessment. Such activities are greatly facilitated when resource information is in an hierarchical structure similar to the Linnaean taxonomy of plant and animal systematics developed in the 18th Century. A systematic hierarchy for vegetation has the great advantage of having data ordered from the general to the specific so that it can be used for different levels of abstraction—national, regional, and/or local.

**Mapping The Southwest Landscape**

One obvious advantage of mapping natural vegetation is to illustrate and thereby measure biological and cultural potential. Land use managers, biologists, agronomists and others concerned with renewable resources can obtain valuable insights into the biotic capabilities of a given area and its actual and potential uses. Biological and cultural limitations are then also often apparent. Especially important, mapping of vegetation (=cover) enables wildlife, forest, and range managers to stratify and sample populations in any given land area efficiently (Leopold, 1933). Statistically valid surveys then can be used to measure and predict an area's wildlife density, timber potential, and range capability (see e.g. Brown and Smith, 1976). Areas to be assessed can range in size from a few acres to subcontinental units.

The uses of a biotic community (or vegetation) map to the student of natural history are also readily apparent. Plant and animal distributions can be plotted and determinations made as to their actual and expected occurrence. Knowledge of an organism's distribution in relation to natural communities can provide insights into factors responsible for or influencing a species' occurrence, density and limitations. So important is this knowledge that the study and mapping of plant distribution (phytogeography), animal distribution (zoogeography), and biome distribution (biogeography) have become recognized sciences in their own right.

Biogeographic maps are essential to those interested in the identification, study, acquisition, and preservation of natural areas (see e.g. Dasmann, 1976; Franklin, 1978; Udvardy, 1975). Their use greatly facilitates the comparison and selection of representative habitats through the delineation of representative candidate areas. Similar areas can then be sampled and quantified before a choice is made. Perhaps, equally or more important, types not heretofore protected can be identified.

The chapters of this publication describe the biotic communities outlined on a map of the Southwest (Brown and Lowe, 1980). The first edition of this map (Brown, Lowe, and Pase, 1978) was a major contribution in bringing together information at the biome level. The revised map (Brown and Lowe, 1980) and the hierarchical classification system in Appendix I provides an ecological base for the location of plant and animal communities for the American Southwest and parts of Mexico.

As a result of the increased emphasis to develop systems for vegetation classification and related habitat factors (Chambers, 1974; Driscoll et al., 1978; Donart el al., 1978a; Brown et al., 1980), land managers in Arizona and New Mexico are beginning to manage in terms of ecological units (Montane Conifer Forest, Sonoran Desert, etc.) instead of purely geographic areas (Mogollon Rim, Kaibab Plateau, etc.) and descriptive terms (salt marsh, cold desert, etc.). The ecological unit has meaning to plant geographers, ecologists, and biologists because of its common evolutionary history; a geographical or descriptive area may or may not have a shared flora and fauna with other areas of the same name.

Biotic community data consisting of plant form (tree, shrub, etc.) and structure (seedling, sapling, etc.) and animal profile (use of form and structure for feeding and breeding) is being collected for storing in local and regional wildlife data bases. These data bases are being used to provide information to write environmental analysis reports and environmental impact statements, to evaluate land management practices, and to develop habitat improvement projects. The application of biotic community data for decision making will increase as biologists in state and federal agencies accumulate better information on the management of all species in an ecosystem.