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*A. C. Nurseries, Inc. v. Brady*, 278 App. Div. 974, 105 N.Y.S. 2d 933 (2nd Dept 1951).

Ackrill, J. L. 1966. *Aristotle's Categories and De Interpretatione*. London, England: Oxford University Press.

Advisory Committee on Zoning, Department of Commerce. 1926. *A Standard State Zoning Enabling Act*. Washington, D.C.: U.S. Government Printing Office.

American Planning Association. 1996. *Land-Based Classification Standards*. Online. Chicago: American Planning Association. Available: <http://www.planning.org/lbcs>. Last Accessed: 27 October 1997.

The main home page for the LBCS project begins here. This link provides access to project-related publications, documents, and information about the project status and the Technical Advisory Panel.

American Planning Association, San Diego Section. 1997. *At This Moment, Planning in San Diego, Where We Are and Where We Aren't*. San Diego, California: San Diego Association of Governments.

Anderson, James R., Ernest E. Hardy, John T. Roach, and Richard E. Witmer. 1976. *A Land Use and Land Cover Classification System With Remote Sensor Data*. Washington, D.C.: U.S. Government Printing Office.

This paper describes the four-level hierarchical classification system that is now commonly referred to as the Anderson Classification System. The land-cover and land-use components of this system have now been widely adopted in various formats in local and regional planning applications. At the state level, land-cover categories from this system are still widely used. This standard was the first proposal to integrate land-cover data at all scales (national, state, regional, and local). Government agencies find it most useful for sharing land-use and land-cover data. The focus of this paper is on the first two levels (I and II) of the four that comprise the complete standard. First-level categories are: urban or built-up land; agricultural land; rangeland; forest land; water; wetland; barren land; tundra; and perennial snow or ice. Level I categories are mainly used for remotely sensed data where identifying land-cover categories is automated through spectral analysis and photo-interpretation. Applications at large scales, such as national, regional, or multistate areas use it. Level II categories consist of land uses and land covers suitable for applications at the statewide or countywide scales. In the urban or built-up land category, Level II categories include: residential; commercial and services; industrial; transportation, communications, and utilities; industrial and commercial complexes; mixed urban or built-up land; and other urban or built-up land. Level II categories serve to integrate land-cover data (using Level I categories) and land-use data (typically Levels III & IV categories). For parcel-level data, the classification has relevant categories in Levels III and IV, which are most appropriate for local planning applications. For areas that have complex land uses, such as suburban, rural, and conservation areas, the authors suggest that, instead of using levels III and IV, categories should follow along the lines of the 1965 *Standard Land-Use Coding Manual* (SLUCM).

Anderson, Larz T. 1995. *Guidelines for Preparing Urban Plans*. Chicago, Illinois: Planners Press.

Arizona Geographic Information Council. 1996. *Arizona Geographic Information Council*. Online. Phoenix: Arizona Geographic Information Council. Available: <http://www.state.az.us/gis3/agic/agicgraphics.html>. Last Accessed: 26 November 1997.

Arizona Geographic Information Council (AGIC) coordinates the development and management of geographic information systems (GIS) and geographic data in Arizona. This site has information about developing plans for managing the natural, cultural, economic, and infrastructure resources specific to Arizona. It also includes reports, news releases of GIS studies in Arizona, and references to other links related to GIS.

Arthur, Tracy, and Dr. Toby Carlson. 1997. "New Perspectives on Land Use/Land Cover Analysis and Urbanization." *Pennsylvania Planner*, no. 79: 1-2.

Two meteorologists explain the use of satellite images in analyzing urban microclimates. Since variations in microclimates depend on several factors, the authors developed a computer model to predict such changes. Variables the model takes into consideration include local surface temperatures, vegetation, and moisture—each affected by the degree of urbanization. By examining land-cover changes due to urbanization, the model also establishes the relationship between changes in micro-climates and urbanization. The authors used Landsat satellite images of Chester County, Pennsylvania, to study this relationship. For classifying the land-cover data from satellite images and combining that with local spot-checked data, the model employed the following categories: bare soil, vegetation, forest, water, and urban development.

Asenjo, F.G. 1988. *IN-BETWEEN: An Essay on Categories*. Washington, D.C.: Center for Research in Phenomonology and University Press of America.

Atlanta Regional Planning Commission. 1985. *Land-Use Information System*. Atlanta, Georgia: Atlanta Regional Planning Commission

Aurora, City of. 1989. *City of Aurora Colorado Comprehensive Plan Map*. Aurora, Colorado: City of Aurora, Colorado.

Bailey, Robert G. 1993. *Baileys' Eco-Regions (July 1995)*. Online. Fort Collins, Colorado: USDA Forest Service. Available: [http://www.fs.fed.us/land/ecosysmgmt/ecoreg1\\_home.html](http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html). Last Accessed: 25 November 1997.

This site hosts Robert Bailey's land-cover classification system, which is widely used for forest inventories by the U.S. Department of Agriculture. This system is hierarchical, with the three classes, domains, divisions and provinces at the top level. Online maps on the site, which are interactive, show areas of the U.S. under each of these classes. For provinces, the interactive maps also show details about other conditions, such as soils, climates, land surface forms, vegetation, and fauna along with images of land forms.

Baltimore Department of Planning. 1974. *Baltimore Land Use Coding System: A Proposed System for Coding Land*

*Use Activities.* Baltimore, Maryland: City of Baltimore.

Bartholomew, Harland. 1955. *Land Uses in American Cities.* Cambridge, Massachusetts: Harvard University Press.

Harland Bartholomew pioneered standard land-use classifications in the early 1950s as a way to easily conduct comparative studies for his consulting firm. Since the firm was then also assisting several communities in preparing comprehensive plans, its classification scheme became a de facto standard. Even communities that did not hire the firm began adopting it. Soon planning schools and planning textbooks adopted this scheme for planning education. This book applies the classification standard to compare land uses in major cities across the country. It shows a snapshot of the composition of land uses in 86 cities of varying sizes and character—central cities, satellite cities, and urban regions. In this classification system, land uses at the top level were classified as either developed or vacant. At the next level, the developed areas are classified as either privately or publicly developed areas. Privately developed areas include single-family, two-family, and multifamily dwellings, commercial, and light and heavy industry categories. Publicly developed areas include streets, railroads (even though they may be private), parks and playgrounds, and a catch-all category for other public and semi-public properties. The data shows the differences in development patterns, densities, and spatial distributions among the cities surveyed, but more importantly, reveals some common patterns. For example, about one third of all developed areas are in single-family, one fourth are used for streets, and one tenth are in commercial and industrial uses. Another significant contribution this survey made was the development of multipliers for allocating land by land-use types. For instance, it was found that cities consumed commercial lands at the rate of one acre for every 400 residents. Such thumb rules derived from this book were used by planners for several decades in land allocation models, comprehensive plan projections, and zoning and density analysis (even though no densities in terms of either dwelling units per acre or gross floor area were tabulated). Appendix B shows the land-use categories along with their letter codes and the list of businesses and land-use activities that are grouped in each category.

Barton-Aschman Associates, Inc. 1963. *A Uniform Coding System for Land Use.* Evanston, Illinois: Barton-Aschman Associates, Inc.

As part of the preparation of the final 1965 *Standard Land Use Coding Manual*, Barton-Aschman Associates, Inc., developed two background reports. This technical guide was the first report, and *Land-Use Coding Practices* was the second. Both formed the basis for developing SLUCM. This report contains the debate about the selection of activity over other land-use characteristics as the sole determinant for grouping categories in SLUCM. Discussions about other characteristics include functional uses, influence of a use on surrounding uses, flexibility or an ability of a use to change, and value-based characteristics. The authors identified more than 20 different characteristics along with their relative importance for various kinds of planning studies (land-use, transportation, facilities planning, zoning, urban renewal, etc.). Although the emphasis of the classification was on activity characteristics of land uses (thus, more appropriate for large urban areas), the report also covers how communities with populations below 50,000 can classify, collect, and apply land-use data for Urban Planning Assistance Programs under Section 701 of the Housing Act. This includes suggested practices for surveying land uses, data collection methods, data storage methods, and data presentation techniques. The section on presentation techniques shows graphical representation of

land uses and preparing maps using uniform coloring and hatching standards. The last section of the report lists all the land uses in the three-level hierarchy of the classification along with their four-digit activity codes.

----. 1964. *Land-Use Coding Practices 1963*. Evanston, Illinois: Barton-Aschman Associates, Inc.

This is the second of the two background reports prepared by Barton-Aschman Associates, Inc., for the Urban Renewal Administration of the Housing and Home Finance Agency. *Uniform Coding System for Land-Use: A Technical Guide* was the other. The report's purpose was to include background information about the findings and recommendations contained in the technical guide. Both reports together formed the bases for developing the final 1965 SLUCM. Of importance in this report is the detailed discussion about activity, function, and 20 other land-use characteristics, and how they are related to developing uniformity in land-use data. Examples of applications that employ these data characteristics include Census Bureau demographic studies; transportation studies, such as the Chicago Area Transportation Study (CATS) and Penn-Jersey Transportation Study; metropolitan planning studies in Michigan, Illinois, Pennsylvania, and Arkansas; and regional, local, and special area plans in Minneapolis, Denver, and Wichita.

Bassett, Edward M. 1940. *Zoning*. New York: Russell Sage Foundation.

Bibby, J. S. n.d. *Land Use Capability Classification*. n.p.: Rothamsted Experimental Station.

*Board of Park Commissioners of the Cleveland Metropolitan Park District v. City of Bay Village*. 78 L. Abst. 389, 390, 141 N.E.2d 769, 770 Ohio App. (1957).

Bruner, Jerome S, Jacqueline J. Goodnow, and George A. Austin. 1956. *A Study of Thinking*. New York: Wiley.

Cape Cod Commission. 1991. *Regional Policy Plan Atlas For Barnstable County, Massachusetts*. Barnstable, Massachusetts: Cape Cod Commission.

Cartographic Information Center, University of Delaware. 1997. *Cartographic Information Center*. Online. Newark, Delaware: University of Delaware. Available: <http://www.rdms.udel.edu/dgs/cicMap.html>. Last Accessed: 30 November 1997.

Center for Land-use Interpretation. 1997. *Land Use Database*. Online. Culver City, California: The Center for Land Use Interpretation. Available: <http://clui.zone.org/clui/database/ldusdb.html>. Last Accessed: 25 November 1997.

Chapin, F. Stuart Jr., Edward J. Kaiser, and David R. Goldschalk. 1995. *Urban Land Use Planning*. Urbana, Illinois: University of Illinois Press.

First published in 1957, this book has become a standard reference in the planning profession. In this, the fourth edition, the authors expand on traditional planning methods to current trends in environmental values and new uses of land in urban regions. This edition also introduces new computer technologies and processes that can support planning functions. The land classification

chapter provides a framework for drafting a land classification system. It is based on the assumption that all categories can be derived from the three major types of planning: conservation, rural, and urban. Each of these purposes further defines the objectives by balancing the three systems: natural, human activity, and market. For instance, critical areas under conservation planning, agricultural reserves under rural areas planning, and redevelopment areas under urban planning balance the three systems with the objectives. Using such objectives, the authors suggest, planners can develop any land classification system with a hierarchy of categories to address the needs of land-use planning. This purpose-driven classification process is similar to Guttenberg's prescriptive classifications for regions when applied to Grigg's regional classification methodology. For instance, land classes in one example in the book show developed, transition, community, rural, and conservation as general categories. From these general categories, the authors suggest, specific land uses and activities could be grouped using a standard hierarchical system.

Chicago Fire Department. 1985. *Chicago Firehouse Location Report*. Chicago, Illinois: City of Chicago.

Cihlar, Dr. Josef. 1997. "Last Look: 1993 Canada Land Cover." *Earth Observation Magazine* 6, no. 3: 62.

For land-cover categories, the Manitoba Remote Sensing Centre in Winnipeg, Manitoba, Canada, in collaboration with the Canadian Forest Service, used 31 cover classes to process satellite-based Advanced Very High Resolution Radiometer images. These land-cover classes include: 15 forest-types, three shrub lands, eight crop and grass lands, and five barren lands. This classification system is now being evaluated by the Canada Centre for Remote Sensing to estimate areas in each of the 31 individual land-cover classes in its sustainable forest development programs.

Clark County, Nevada. 1990. *Coding Scheme for Existing Land Uses*. Las Vegas, Nevada: Clark County, Nevada.

----. 1993. *Land-Use Categories for Use Modified Assessor Codes*. Las Vegas, Nevada: Clark County, Nevada.

----. 1998. *Land-Use Compatibility in the Airport Environs Overlay District*. Las Vegas, Nevada: Clark County, Nevada.

Clawson, Marion. 1968. *The Land System of the United States: An Introduction to the History and Practice of Land Use and Land Tenure*. Lincoln, Nebraska: University of Nebraska Press.

----. 1964. *Man and Land in the United States*. Lincoln, Nebraska: University of Nebraska Press.

Clawson, Marion, and Charles L. Stewart. 1966. *Land Use Information: A Critical Survey of U.S. Statistics Including Possibilities of Greater Uniformity*. Washington, D.C.: Resources for the Future.

Cleveland, Ohio City of. 1991. *Cleveland Civic Vision 2000 Citywide Plan*. Cleveland, Ohio: City of Cleveland, Ohio.

Cobb County, Georgia. 1995. *Cobb County Comprehensive Plan: A Policy Guide 1995-2015*. Marietta, Georgia: Cobb County.

Cobb, Rodney. 1997. *Accessory Housing Units: Guidebook & Model State & Local Legislation*. Washington, D.C.: American Association of Retired People.

Core Software Technology and Urban and Regional Information Systems Association (URISA). 1996. *Virtual Data Fair*. Online. Pasadena, California: Core Software Technology. Available: [http://www.coresw.com/~ted/virtual\\_data.html](http://www.coresw.com/~ted/virtual_data.html). Last Accessed: 1 December 1997.

De Chiara, Joseph, and Pratt Institute School of Architecture. 1969. *Planning Design Criteria*. New York City New York: Van Nostrand Reinhold Co.

For site planning and design standards, this book is a venerable reference for planners in the U.S. Planners have used this reference for producing uniform maps, graphics, and construction drawings. The land-use chapter contains references to SLUCM. A section on color coding matches Prisma Colors with standard land-use categories. The scheme follows standard color schemes: yellow for single-family residential uses; browns for multifamily residential uses; reds for commercial uses; grays for industrial uses; greens for recreational uses and open space; and blues for institutional uses. Other examples show mapping age of buildings, lot area per family, and land values.

Denver Regional Council of Governments. 1996. *Land Use Inventory Categories*. Denver, Colorado: Denver Regional Council of Governments.

Di Gregorio, Antonio, and Louisa J. M. Jansen. 1996. *Food and Agriculture Organization of the United Nations Land Cover Classification: A Dichotomous Modular-Hierarchical Approach*. Rome, Italy: Food and Agriculture Organization of the United Nations.

The United Nations Food and Agriculture Organization (FAO) developed this hierarchical land-cover classification system to manage global projects dealing with agricultural and natural systems. The system's purpose is to classify remotely sensed data for areas in Asia and Africa, which often do not have other local sources for such data. Set up as a binary tree, this system classifies all lands as either vegetative or nonvegetative. Each category is further divided into two subcategories, terrestrial and aquatic, which are in turn further subdivided into natural and cultivated lands. Environmental and technical attributes of land appear after the third level in the binary tree. Examples of environmental attributes include land forms, erosion types, and climatic conditions. Technical attributes include spatial characteristics, local cultural practices, water persistence, and crop information. The Federal Geographic Data Committee's Earth Cover Working Group has a liaison with the FAO to make global land-cover classifications consistent between U.S. standards and the United Nations programs.

Dona Ana County. 1992. *Dona Ana County Assessor's Department Land-Use Codes*. Las Cruces, New Mexico: Don Ana County.

----. 1992. *Planning Department Land-Use Classification System*. Las Cruces, New Mexico: Dona Ana County.

----. 1996. *Dona Ana County Expanded Coding Structure Land-Use Codes*. Las Cruces, New Mexico: Dona Ana County.

- Dramstad, Wenche E., James D. Olson, and Richard T.T. Forman. 1996. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*. Washington, D.C.: Harvard University Graduate School of Design, Island Press, and the American Society of Landscape Architects.
- Dreyer, Peter. 1993. "Classification of Land Cover Using Optimized Neural Nets on SPOT Data." *Photogrammetric Engineering & Remote Sensing* 59:617-21.
- Driscoll, Richard, Daniel Merkel, James Hagihara, and David Radloff. 1983. *A Component Land Classification for the United States: Status Report*. Denver, Colorado: U.S. Department of the Interior.

This classification system provides a framework for classifying land based on ecology for the Interagency Agreement Related to Classification and Inventories of Natural Resources. The agreement's purpose was to minimize duplication of resource management efforts among the U.S. Department of Agriculture's Forest Service and Soil Conservation Service, and the U.S. Department of Interior's Bureau of Land Management, Fish and Wildlife Service, and Geological Survey. The system is hierarchical, with four top-level components: soils, water, landform, and vegetation. The soil component consists of the six categories: orders, suborders, great groups, subgroups, families, and series, each of which is based on the soil taxonomy in the Soil Survey conducted by the Soil Conservation Service. The water component is based on characteristics to support life (in and on the water) as the primary attribute. Additional attributes for water bodies also include soil and vegetation. Land forms are classified by either morphometrics (slope, elevation relief, etc.), surficial materials, or genesis (formative process). This standard is useful for inventorying environmental aspects of land cover where land uses of the built environment are secondary.

- Dumouchel, Robert J. 1975. *Dictionary of Development Terminology*. New York City, New York: McGraw Hill Book Company

This dictionary is geared towards professionals in the land development field. It contains approximately 2,000 definitions in addition to a list of abbreviations and acronyms. The scope of the definitions cover legal terms, governmental programs, governmental agencies and bureaus, appraiser and tax, finance, building construction, building structure, and city planning, and zoning.

- DuPage County Development Department. 1995. *1995 Land-Use Survey Coding Sheet*. Wheaton, Illinois: DuPage County.

- Eagle Point Software. 1997. *Graphic Database Structure*. Dubuque, Iowa: Eagle Point Software.

- Eau Claire, City of. 1993. *Eau Claire Comprehensive Plan, Land-use Plan Categories*. Eau Claire, Wisconsin: City of Eau Claire.

- Ellis, Scott L. 1977. *Guide to Land Cover and Land Use Classification Systems Employed by Western Governmental Agencies*. Washington, D.C.: United States Department of the Interior.

This report summarizes a survey of land-use and land-cover classifications used by governmental agencies in 18 western states and two Canadian provinces for the Federal Wildlife Service habitat assessment programs. The study, done by the Office of Biological Services of the U.S. Fish and

Wildlife Service, is in three sections. Section I has 19 regional and multiregional classification systems including: the Forest Service's Land Systems Inventory; the Soil Conservation Service's Land Resource Regions; and the Nature Conservancy's Heritage Program Classification. Section II has over 50 state and subregional classification systems from Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nevada, New Mexico, North Dakota, South Dakota, Oregon, Texas, Utah, Washington, and Wyoming. Section III has Canadian examples from Alberta and Manitoba. This report does not list any of the classification systems surveyed, but only a summary of their characteristics. Summaries include descriptions, program objectives of the classification system, land-use and land-cover products developed using the classification system, and, where appropriate, a cross-reference to related classification systems. Three indexes for the classification systems, based on keywords, geographic location, and author names, provide a cross-referencing mechanism. The keyword index is based on the applicability of the classification systems to ecosystem (soils, vegetation, wildlife, land forms), land types (forests, wetlands, rangeland, agriculture, etc.), land capability (for agriculture and irrigation purposes), and classification levels (Anderson levels I, II, and III).

Everhart, Marion. n.d. *Land Classification for Land Uses Management and Valuation*. n.p.: Todd Publications.

European Commission. 1992. *Coordination of Information on the Environment Land Cover (CORINE)*. Brussels, Belgium: European Commission.

Fairfax County, Virginia Office of Comprehensive Planning. 1990. *Coding Scheme for Conceptual and Area Plan Land Uses*. Fairfax, Virginia: Fairfax County.

----. 1990. *Coding Scheme for Existing Land Uses*. Fairfax Virginia: Fairfax County.

----. 1990. *Coding Scheme for Planned Land Uses*. Fairfax, Virginia: Fairfax County.

Federal Emergency Management Agency. 1988. *Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook*. Washington, D.C.: Federal Emergency Management Agency.

Federal Emergency Management Agency and National Institute of Building Sciences. 1997. *HAZUS User's Manual*. Washington, D.C.: Federal Emergency Management Agency.

Federal Geodetic Control Subcommittee. 1997. *Federal Geodetic Control Subcommittee Homepage*. Online. Silver Spring, Maryland: National Oceanic and Atmospheric Administration, National Geodetic Survey. Available: <http://www.ngs.noaa.gov/FGCS/fgcs.html>. Last Accessed: 25 November 1997.

The Federal Geodetic Control Subcommittee (FGCS) of the Federal Geographic Data Committee coordinates the planning and execution of geodetic surveys. It also develops standards and applications for these surveys. FGCS responsibilities include standards setting, testing new geodetic instrumentation and operational systems, coordination of user agency requirements, and dissemination of government data to user agencies.

- Federal Geographic Data Committee. 1993. *Federal Agency Needs for Ground Transportation Networks and Network*. Online. Washington, D.C.: Federal Geographic Data Committee. Available: <http://www.bts.gov/gis/fgdc/pubs/fgdcneeds.html>. Last Accessed: 21 July 1998.
- . 1996. *FGDC Cadastral Data Content Standard for the national Spatial Data Infrastructure*. Washington, D.C.: Federal Geographic Data Committee. Available: <http://www.fgdc.gov/Standards/Documents/Standards/Cadastral/cadstandard.pdf>. Last Accessed: 6 August 1997.
- . 1996. *FGDC Standards Working Group*. Online. Washington, D.C.: Federal Geographic Data Committee. Available: <http://www.fgdc.gov/Standards/Standards.html>. Last Accessed: 25 November 1997.
- . 1997. *FGDC Data Content Standard for Location and Identification of Facilities. Working Draft 2.0*. Online. Washington, D.C.: Federal Geographic Data Committee. Available: [http://www.fgdc.gov/Standards/Documents/Standards/Facility\\_ID/Facidstd.PDF](http://www.fgdc.gov/Standards/Documents/Standards/Facility_ID/Facidstd.PDF). Last Accessed: 9 July 1998.
- . 1997. *FGDC Organization*. Online. Reston, Virginia: Federal Geographic Data Committee. Available: <http://www.fgdc.gov/Org/org.html>. Last Accessed: 25 November 1997.
- . 1997. *The Federal Geographic Data Committee (FGDC) Homepage*. Online. Washington, D.C.: Federal Geographic Data Committee: Available: <http://www.fgdc.gov>. Last Accessed: 25 November 1997.
- FGDC is a consortium of federal departments working to design uniform spatial data standards. Use this site to gain a understanding of the FGDC operations. Some notable links include metadata standards, the FGDC Directory, a clearinghouse of spatial data, and mostly free U.S. geospatial and attribute data.
- . 1997. *FGDC Subcommittee on Cultural and Demographic Data*. Online. Washington, D.C.: U.S. Census Bureau, Dept. of Geography. Available: <http://www.census.gov/ftp/pub/geo/www/standards/scdd>. Last Accessed: 25 November 1997.
- This site describes the functions of the FGDC's Subcommittee on Cultural and Demographic Data. Use this site for links to metadata, downloadable geo-referenced cultural and demographic data from different federal agencies, and minutes from the subcommittee's meetings.
- . 1997. *Framework Overview*. Online. Washington, D.C.: Federal Geographic Data Committee. Available: <http://www.fgdc.gov/Framework/Framework.html>. Last Accessed: 25 November 1997.
- . 1997. *FGDC National Vegetation Classification Standard*. Online. Washington, D.C.: Federal Geographic Data Committee. Available: <http://www.nbs.gov/fgdc.veg/standards/vegstd.htm>. Last Accessed: 7 July 1998.
- . 1997. *FGDC Organization*. Online. Washington, D.C.: The Federal Geographic Data Committee: Available: <http://www.fgdc.gov/Org/org.html>. Last Accessed: 26 November 1997.

- . 1997. *FGDC Utilities Data Content Standard - Public Review Draft*. 1997. Washington, D.C.: Federal Geographic Data Committee.
- . 1997. *FGDC Vegetation Subcommittee Charter*. Online. Washington, D.C.: Federal Geographic Data Committee. Available: <http://www.nbs.gov/fgdc.veg/charter.htm>. Last Accessed: 1 December 1997.

This site addresses lead agency responsibilities for the coordination of terrestrial vegetative data-related activities among federal agencies. It also provides information on data standards for vegetative land cover.

Gallion, Arthur, and Simon Eisner. 1963. *The Urban Pattern*. New York: Von Nostrand.

*The Urban Pattern* is an overview of urban planning and urban geography that includes history, theory, and current planning practices. The chapter about the zoning process contains a classification system for zoning districts that includes categories, such as open land; agricultural; estate; single-family; two family; medium density; high density; mobile home; commercial; hotel; enterprise zones; and industrial districts. Each has subcategories based on the impacts of the use on the environment, economy, and society—impact characteristics normally associated with performance zoning. For example, subcategories under industrial include fire and explosion hazards, radioactivity of electrical disturbances, noise, vibration, smoke, emission of dust, heat, and glare, emission of odors, outdoor storage, and waste disposal.

Gautam, Naresh Chandra. 1982. *Suggested National Land Use/Land Cover Classification System for India Using Remote Sensing Techniques*. Mathura, India: Pink Publications House.

Georgia Department of Community Affairs. 1997. *Department of Community Affairs General Land-use Thematic Classes*. Atlanta: Georgia. Georgia Department of Community Affairs.

Goldschalk, David R., Scott A Bollens, John S. Hekman, and Mike E. Miles. 1986. *Land Supply Monitoring: A Guide to Improving Public and Private Urban Development Decisions*. Boston, Massachusetts: Oelgeschlager, Gunn & Hain.

Gottman, J. 1961. *Megalopolis: The Urbanized Northeast Seaboard of the United States*. New York City, New York: Twentieth Century Fund.

----. 1989. *What are Cities becoming the Center of?*. In Knight R., Gappert (eds). *Cities in a Global Society*. Newbury Park, California: Sage. 58-67

Goultry, George A. 1991. *A Dictionary of Landscape*. Worcester, United Kingdom: Billing and Sons Ltd.

This source is a dictionary defining approximately 3,000 technical terms that deal with land cover or natural surface objects. The definitions in the dictionary range from the common to the obscure. The definitions include terms for geographically specific land cover or surface items, scientific equipment and techniques, minerals, natural resources, soils, vegetation, geographic regions. Although the dictionary defines many land cover terms, there is only a minimal amount of land-use terms.

Grigg, David. 1955. "The Logic of Regional Systems." *Annals of the Association of American Geographers* 55, no. 3: 465-83.

This paper delineates procedures various disciplines use in developing classifications, examines similarities in regionalization and classification processes, and explores regional systems from the principles of classification. The author compares the criteria employed in classification systems developed for the disciplines of botany, zoology, and sociology. From these criteria, he then proposes 10 principles of classification that can be applied to developing regional land-based categories. The discussion about the problems associated with developing classes or categories that are both mutually exclusive and exhaustive might serve as a useful inflection for land-use classifications. Since most regional systems apply hierarchical classifications, the author discusses the common problem of the failure of hierarchical classifications to maintain exclusivity.

Guttenberg, Albert Z. ----. 1959. "A Multiple Land Use Classification System." *Journal of the American Institute of Planners* 25:143-50.

Following the publication of this article, the American Society of Planning Officials published the monograph, *New Directions in Land-Use Classification*, in 1965 by the same author. See Guttenberg (1965) for a complete annotation of this article.

----. 1965. *New Directions in Land-Use Classification*. Chicago, Illinois: American Society of Planning Officials.

This monograph is a more detailed version of ideas and topics originally published by the author in the 1959 article, "A Multiple Land-Use Classification System," in *Journal of the American Institute of Planners* Vol. 25: 14350. Although Wilkens (1941) and Sparks (1958) had addressed similar issues earlier, this was the first proposal of a land-use classification system in the planning profession that can be used as a multipurpose tool: to describe or analyze existing land uses, to evaluate, and to prescribe future land uses. The author highlights the fact that one of the biggest drawbacks of a traditional classification system is its usefulness for describing existing conditions. Using the same system in applications that require prescribing future uses is at best clumsy and impaired. The author draws extensive parallels between the use of language and planning, such as the differences in appraising a situation, valuing a situation, and urging or pushing toward a goal-based solution. The author suggests that the three modes in language theory—appraising, valuing, and urging—are similar to analysis, evaluation, and prescription in planning theory. Because most classification systems used in planning applications are derived or developed only to appraise or evaluate, those applications that require evaluation and prescription suffer from an impaired system. Although three decades have passed since this document was published, the dominant classification in the profession is still appraisive. However, recent federal legislative mandates that place more of the valuation and prescription functions at the local levels are generating enough pressure and the conditions needed to overcome this limitation. In an evaluative land-use classification system, the author suggests using attributes such as the quality of the development or use as criteria for developing categories. According to the author, substandardness is a well-entrenched concept worth classifying even though quality at the high end is subjective. Similarly, other attributes such as economic durability and social impact (health, welfare, and safety), may also be expanded to produce meaningful evaluative categories that environmental applications require for a classification system. After the appraisive and evaluative modes, the third modes is prescription. The author cites the use of clearance and

development, housing code enforcement, and private rehabilitation as categories that neither analyze nor evaluate but indicate community action and control. The subjects or attributes of planning action and control are categories or types of changes described, agents of change, and means of change. Types of changes may include activity changes, use changes, physical changes to a site, or no change. Agents of change may be a private or public entity, but the author emphasizes the need to focus on possible forms of public-private relationships that bring about such changes. The means of producing change include categories such as persuasive and tactical in addition to the traditional regulative (police powers), expropriative (eminent domain), and appropriative (public purchase or acquisition). The author suggests that precise land-use classification systems that use referential, appraisive, and prescriptive categories connects the interests of planning with its concerns. This connection is what determines the form in which land-use data is collected and organized.

- . 1967. *The Social Evaluation of Non-Residential Land Use Substandardness Criteria*. Urbana, Illinois: Bureau of Community Planning.

In 1967, an emerging issue in land-use planning was delineating substandard nonresidential land uses. This standard allows a land-use classification system to capture specific information relating to potential problems that it may be imposing on the physical or social environment. The author considers several criteria in order to define "substandardness" tightly as it relates to land-use classification. These criteria fall into three dimensions that help define the degree of substandardness within nonresidential land uses. Quality relates to comfort and convenience. Criteria in this dimension include age, deterioration, deficiency of basic utilities, and lack of modern amenities. Economic durability relates to how long the parcel will continue to be useful given the current industry trends. Its criteria include structural defects, lack of fire resistance, legal disabilities, and environmental handicaps. The third dimension, social impact, defines existing negative impacts on society. Criteria within this dimension include implications for law enforcement, protection of property against loss and injury, protection of neighboring users and owners, and conservation of resources over development. The overall advantage of instilling this standard within a land-use classification system is that, by capturing and quantifying these dimensions, a planning agency can focus its efforts on alleviating negative impacts caused by substandardness.

- . 1977. "Classifying Regions: A Conceptual Approach." *International Journal of Regional Sciences* 2, no. 1.

- . 1981. *Uniformity and Flexibility in the Classification of Topographic Data. Proceedings*. Montreux, Switzerland: International Congress.

This synopsis shows applications using the multidimensional classifications that the author proposed in the *New Directions in Land Use Classification*. This experimental classification system for topographic objects achieves three goals: standardization of terms and categories, flexibility for refinements of terms and categories, and ability to expand to accommodate new categories without distorting the classification's structure. The topographic data are standardized by grouping categories into three major types of purposes: referential, appraisive, and prescriptive. Using these three purposes allows the naming, classifying, and grouping of topographic objects in a manner that suits the application's purpose. This also ensures that existing terms, standards, and classifications accommodate the framework. In other publications, the author also shows how this framework can serve land uses,

land-use activities, and other abstract concepts, such as land uses and activities that are not topographic objects.

- . 1993. *The Language of Planning: Essays on the Origins and Ends of American Planning Thought*. Champaign, Illinois: University of Illinois Press.

Guttenberg wrote this collection of essays and papers about classification systems in land-use planning over several decades. The classification systems that the LBCS project describes are in one way or another covered in this book. Guttenberg's proposal for a multidimensional classification system for planning is based on these essays. The essays examine classifications from various angles: social and physical planning concepts, linguistic theory, symbolism, and perceptions of urban structure and growth. Guttenberg traces the differences in emphasis in social versus physical planning concepts that affect the purpose of planning and therefore the classification system. The multidimensional classification system, which is covered in the chapter, "New Directions in Land Use Classification," is based on the differences in land policies between social and physical planning concepts. See the annotation for Guttenberg (1965) for a more detailed description. For classifying regions, Guttenberg uses the same three modes or types of planning purposes to develop a classification system. Through examples, the author shows how the purpose of planning can help identify planning terminologies. Using patterns in human behavior, language, and regional studies, the author classifies all planning purposes as either referential, appraisive, or prescriptive. The author also traces the history of American planning in terms of the policies that affected the way land was treated. For example, he outlines the major differences in planning between the eastern and western U.S. Each had its effect on the way planning is perceived and, therefore, its purpose and the type of classification system necessary to satisfy the goals. The western regions are characterized as "the joining of values of family farming with the opportunity of commercial agriculture" and the eastern regions as a "marriage of town and country." Guttenberg summarizes American planning policies in the twentieth century in three major time periods: Progressive Era (1900-1920), Depression Era (1929-1945), and Modern Era (1945-present). From classifying individual properties and regions, Guttenberg explains transnational land-use issues. The planning policies underlying these are mainly economic and environmental issues, and their units may be similar to local planning, but they always include aspects of global commerce or the environment. For example, multinational and transnational economic entities divide the world order into economic units and environmental issues into regions related by nature, resources, or pollution. The book concludes with a series of essays about: urban structure and growth; how the structure is influenced by and related to people; geographic distances between facilities; and community size.

- Howard, John T. 1941. "Comment on 'The Planning Approach to Categories of Land Use'." *Journal of the American Institute of Planners* 7, no. 3: 24-27.

As a follow-up to the Wilkens proposal in "The Planning Approach to Categories" (see Wilkens 1941), the author proposes a few additional steps. One is to urge the A.I.P. Board of Governors to initiate a standards process with adequate resources and to have the classification system developed in two stages. The first stage would be to adopt an interim classification system like the one used for the city of Los Angeles. This interim system can then be followed by a more detailed classification system based on the science of urban planning for both diagnostics and prescriptive applications.

Howe, Rex C. 1985. "Review of Land Classification for Land Uses Management and Valuation." *The Real Estate Appraiser and Analyst* 51.

Idaho Dept. of Water Resources. 1997. *Idaho Geographic Information Center*. Online. Boise: State of Idaho. Available: <http://www.idwr.state.id.us/idwr/planpol/techserv/resinfo/gis.htm>. Last Accessed: 26 November 1997.

This site contains the GIS data and file holdings of the Idaho Department of Water Resources. Use this site to view the Idaho GIS metadata standards.

Idaho Geological Survey. 1997. *Digital Mapping and Information Lab*. Online. Moscow: University of Idaho. Available: [http://www.uidaho.edu/igs/dmi\\_lab/home\\_dmi.html](http://www.uidaho.edu/igs/dmi_lab/home_dmi.html). Last Accessed: 26 November 1997.

The site contains geologic spatial information about Idaho, including geologic maps and spatial/geologic databases.

Institut d'Aménagement et d'Urbanisme de la Région d'Ile-de-France. *Categories for Land-use Modes (MOS), A Regional Inventory of Land-Use*. Paris, France: Institut d'Aménagement et d'Urbanisme de la Région d'Ile-de-France.

Institute of Transportation Engineers. 1992. *Transportation Planning Handbook*. Englewood Cliffs, New Jersey: Prentice Hall.

Inter-County Regional Planning Commission. 1965. *Land-Use Classification Manual*. Denver, Colorado: Inter-County Regional Planning Commission.

International Association of Assessing Officers. 1980. *Standard on Property Use Codes*. Chicago, Illinois: International Association of Assessing Officers.

Khorram, Siamak. 1988. *Comparison of Landsat MSS and TM Data for Urban Land Use Classification*. Raleigh, North Carolina: North Carolina State University, School of Forest Resources.

King, Robin B. 1989. *Land Use/Cover Classification for the Proposed Superconducting Supercollider Study Area, Northeastern Illinois*. Champaign, Illinois: University of Illinois.

Klein, Dennis H. 1996. *Graphic Database Structure*. Dubuque, Iowa: Eagle Point Software.

Lakoff, George. 1987. *Women, Fire, and Dangerous Things: What Categories Reveal About the Mind*. Chicago, Illinois: University of Chicago Press.

This is an expansive book in the field of cognitive sciences summarizing recent research findings and ideas about conceptual thought process in humans. Its focus is on categories and how they are made to fit the real or perceived world in language, action, and thought. The central thesis of this work refutes the classical view (also known as the traditional view, which is based on Aristotle's *Categories*) that members of a category share some common properties and categories are defined solely by these

properties. Because categories about concepts, as opposed to observable things, are derived from human experience, perception, and social environment, cognitive scientists now find that the classical view is just one of many ways of defining categories. For example, some conceptual categories go beyond literal representation of real-world objects and rely on metaphor and imagination; that is, properties based on the observer and not the object observed also determine categories. Even for some of the observable characteristics, evidence from research covered in this book implies that some categories may have members that do not share a single common property among themselves; they are, nevertheless, grouped together even if some of them are related. The book's title is based on a compelling example of such a complex category. It refers to some members of a category for which the Australian aboriginal language, Dyirbal, uses the word "balan," where the concept embodied by this term also includes things which are not dangerous too. In fact, there is no one property shared by all the members of this category. Because many categories for land uses, unlike land cover, are conceptual and not always observable, the implication of the theory of cognitive models on concepts like land use in planning can be profound. Guttenberg (1993, Ch. 2) first discussed such complex categories in city planning and the role land-use terminology plays in not only defining categories, but also what planning is.

Land, Nicholas. 1991. *"The Classification and Coding of Spatial Information."* Ph.D. diss., East London Polytechnic.

The author proposes a national land-use classification standard based on a multi-hierarchical system. As proposed, the system is intended primarily to standardize cartographic mapping in the United Kingdom by Ordnance Survey. It includes terms that are mostly associated with topographic applications. Although there are some land uses and land-use activities in the classification system, they are mostly to clarify topographic delineation in cartography applications. The essential feature of this classification system is the thesaurus of land-use and topographic terms. The thesaurus includes features and attribute definitions organized in a format similar to a library classification system. Each entry in the thesaurus database consists of fields for definitions, synonyms, related terms, narrow terms, and the generic land-use categories to which the term applies. For example, a bus station is defined as the place where the bus starts, breaks, or ends its journey and at the point where passengers disembark. It is under the class "Constructed Cover: Transport Associated (Road)." Bus terminal is its synonym. Related terms are air terminal, ferry terminal, freight terminal, passenger terminal, coach station, and mainline station. Each of the related terms, broader terms, and narrower terms have separate entries in the thesaurus, as does the term "Constructed Cover." The author's intention is to have multiple or unlimited hierarchies without having a fixed number of levels where an object (land form) could be assigned one or more categories. Much like locating a book in a library catalog system, the object can be referenced through multiple categories and classes. The principle justification is through "facet analysis," which is similar to the dimensions in land classification that Guttenberg (1959, 1967) proposed. However, the classification system does not address the questions related to land-based data. For example, how can multiple groupings account for over counting (the 100 percent problem). A thesaurus format provides only one view of the classification system at a time—true definition. It does not easily provide views of relationships between categories. The author also asserts that a coding system is not required because each term is a definition in the thesaurus, which is a code itself. In practice, many applications produce data that cannot be "cross walked" without a coding system. Moreover, without a coding scheme, every data exchange would

require a translation step even when both the original application and the destination application share classification systems.

Langkford, Phillip M., and R. Keith Semple. 1973. "Classification and Geography." *Geographia Polonica* 25: 36-45.

Lee, Kyoo Seock. 1983. *Estimating Floodplains From DTM Data for Use With Landsat Land Cover Classification*. Champaign, Illinois: University of Illinois at Urbana-Champaign.

Lehman, Robert. 1995. *The Zoning Dictionary*. Barrie, Ontario, Canada: Lehman and Associates.

This dictionary defines terms typically found in a zoning ordinance. All of the definitions in the dictionary are found in plans or ordinances by municipal governments throughout the United States. The Dictionary contains a topical index in the beginning. The topical index list terms for residential uses, commercial, industrial, institutional, open space, tourism, agricultural, building structures, and landscape, parking, water, transportation, signage, and occupational terms.

Lenco, Michel., and Y. Heyman. 1993. *Study of the State and Changes of the Upper Valley in the Alpine Mountains*. Graz, Austria: French Ministry of Environment.

Lincoln-Lancaster County Planning Department. 1988. *City-County Planning Department Land-Use Inventory Coding Conventions*. Lincoln, Nebraska: Lincoln-Lancaster City-County Government.

Logie, Gordon. 1978. *Glossary of Population and Housing*. New York City, New York: Elsevier Publishing Company.

This source defines land-use terms in English, French, Italian, German, Dutch, and Swedish. The glossary covers planning terms that deal with demography and population, building structure, statistics, and housing policy. In additions, the glossary also defines social science terms that deal with migration, family, and society.

Los Alamos National Laboratory. 1997. *Facility for Information Management, Analysis, and Display (FIMAD)*. Online. Los Alamos, California: Los Alamos National Laboratory. Available: <http://ees.lanl.gov/fimad>. Last Accessed: 26 November 1997.

The Facility for Information Management, Analysis and Display contains tools and systems needed to support the large amount of spatial and tabular data. There are maps of orthophotos and digital elevation models.

Los Angeles, County of. 1981. *Malibu Santa Monica Mountains Area Plan*. Los Angeles, California: County of Los Angeles.

----. 1991. *Santa Clarita Valley Area Plan*. Los Angeles, California: County of Los Angeles.

----. 1991. *Hacienda and Rowland Heights Area Plan*. Los Angeles, California: County of Los Angeles.

- Lovejoy, P. S. n.d. "Theory and Practice in Land Classification." *Journal of Land and Public Economics* 1166-67.
- Marietta, City of. 1996. *General Land-use Map*. Marietta, Georgia: City of Marietta
- Mark, David M., and A.U. Frank. 1991. *Cognitive and Linguistic Aspects of Geographic Space*. Boston, Massachusetts: Kluwer Academic Publishers.
- Marshall, Neil and Peter Wood. 1995. *Services and Space: Key Aspects of Urban and Regional Development*. New York City, New York: John Wiley and Son.
- Maryland Department of Natural Resources, Water Resources Administration. 1993. *Wetland Mapping*. Annapolis, Maryland: Maryland Department of Natural Resources.
- Maryland Department of State Planning. 1975. *The Land Use Classification System*. Baltimore, Maryland: State of Maryland.
- Funded by the U.S. Department of Housing and Urban Development and the National Aeronautics and Space Administration (NASA), this report describes the methodologies and characteristics of land-use inventories and classification schemes for county land-use maps. Because the county land-use maps form the basis of the statewide land-use plan, the Maryland State Planning Office developed the methodologies to standardize inventory methods and classifications. The methods describe how land-cover data from satellite imagery at the 1:130,000 scale from NASA and historic data from aerial photographs from U.S. Department of Agriculture maps at the 1:20,000 scale can be integrated with local land-use data for developing county land-use maps. The classification scheme is a modified version of the Anderson Level III developed by the USGS in 1973. Modifications allowed the integration of land-cover types with land-use categories by correlating historic map data with existing land uses and using standard assumptions for differences in scale. The resultant classification scheme includes categories for land cover (from Anderson Level II), land uses like retail, wholesale, industrial, etc. (from Anderson Level III), and standards for units of measurement (10-acre grids for some uses). The appendices in the report contain two sets of definitions—before and after applying the standard—and details of changes to the categories from Anderson.
- Massachusetts, The Commonwealth of. Department of Revenue, Division of Local Services. 1986. *Guidelines for Classification and Taxation of Property According to Use, Property Type Classification Codes*. Boston, Massachusetts: The Commonwealth of Massachusetts.
- Massachusetts Executive Office of Environmental Affairs. 1992. *MasGIS Datalayer Descriptions and a Guide to User Services*. Somerset, Massachusetts: Massachusetts Executive Office of Environmental Affairs.
- McCrary, Steven, Colin O. Benjamin, and Vijay E. Ambavanekar. 1996. "Consensus Building in Small Communities." *Journal of Urban Planning and Development* 122, no. 2: 46-70.
- McHarg, Ian L. 1969. *Design With Nature*. Garden City, New York: American Museum of Natural History.

This is McHarg's influential work on environmental assessment techniques for physical planning. It shows the use of overlay methods to identify areas constrained by environmental, social, cultural, and

economic factors. In one example, which illustrates route selection for a road, the author identifies several constraints, each with its own suitability scale. For instance, under physiographic obstructions, slope, surface drainage, soil drainage, bedrock foundation, soil foundation, and susceptibility to erosion are separate layers. Each layer consists of suitability zones 1, 2, and 3. For slopes, these zones correspond to areas with slopes of at least 10 percent, areas between 10 percent and 2 percent, and areas with slopes of less than 2 percent. Similarly, for social values, the overlays include land, historic, water, scenic, forest, recreation, wildlife, residential, and institutional values. The composite overlays from physiographic characteristics and social values on a map show areas of least cost (social and environmental) alignment for the road. Other examples for regional, state, or national level development proposals illustrate overlay techniques for other ecological factors. Consolidating several overlays, the author illustrates suitability maps for recreation, urban development, forest areas, and agricultural areas. The land-use categories employed in all of these techniques are basic, but the value characteristic associated with each factor is complex and sometimes arbitrary. Some physiographic characteristics have only three gradations, and some compatibility or suitability criteria are minimally useful in practice. These categories and zones, nevertheless, are useful in developing a multidimensional classification system such as Guttenberg (1965) suggested.

Michigan Department of Natural Resources. 1986. *Michigan Resource Information System (MIRIS)*. Lansing, Michigan: Michigan Department of Natural Resources.

Miles, I. 1988. *Home Informatics: Information Technology and the Transformation of Everyday Life*. London, England: Frances Pinter.

----. 1993. "Services in the New Industrial Economy". *Future*. July-August: 653-72

Ming, Lee T. 1990. *Updating Land Use Classification of Urbanized Areas in Northeastern Illinois Using SPOT and TM Satellite Data*. Champaign, Illinois: University of Illinois at Urbana-Champaign.

Missouri Resource Assessment Partnership. 1996. *Missouri Land Cover Classification Scheme*. Online. Columbia, Missouri: Missouri Resource Assessment Partnership. Available: <http://www.msc.nbs.gov/morap/lcclasstx.html>. Last Accessed: April 1998.

Montpelier, City of . 1990. *Montpelier Master Plan, Generalized Land-use Categories*. Montpelier, Vermont: City of Montpelier.

Moskowitz, Harvey S., and Carl G. Lindbloom. 1983. *The New Illustrated Book of Development Definitions*. New Brunswick, New Jersey: Rutgers University Center for Urban Policy Research.

This book defines and illustrates building structure specifically for terms for zoning ordinances. This includes terms related to infrastructure, land-cover, landscape, environment, urban design, property rights, and building structure planning. Often the text definitions are supplements with both graphics.

Murray City, City of. 1987. *Standard Land-Use Code—Adopted by Ordinance 8716*. Murray City, Utah: City of Murray City.

This is a good example of a coding system for zoning. Although it follows the SLUCM hierarchical organization, the broad categories differ as follows: living area; manufacturing industries; transportation; communication and utilities; trade, wholesale, and retail; services; cultural, entertainment, and recreation; resource production and extraction; undeveloped land; and water. The classification system has more than 1,500 land uses in categories and subcategories that the zoning ordinance refers to in the permitted and prohibited use list for this city of 34,500 people and 9.8 square miles.

NATO Advanced Study Institute on Cognitive and Linguistic Aspects of Geographic Space, David Mark, and Frank Andrew. 1991. *Cognitive and Linguistic Aspects of Geographic Space: Proceedings of the NATO Advanced Studies Institute on Cognitive and Linguistic Aspects of Space, Las Nava Del Marques, Spain, July 8-20, 1990*. Boston, Massachusetts: Kluwer Academic Publishers.

This is a collection of 28 papers about cognitive and linguistic aspects of geographic space presented at the NATO Advanced Study Institute. The papers represent current research ideas about "space" in various disciplines, such as geography, linguistics, psychology, anthropology, mathematics, and engineering. A sub-theme of the presentations is the relationship of concepts of space to GIS, especially the limitations of language in describing geography and the limitations of computer systems to represent geographic reality adequately. Christian Freksa's paper asserts that spatial categories depend on human senses: visual, motor, auditory, tactile, and others. From a behavioral perspective, Mark Blades's paper suggests that spatial categories can be traced to human wayfinding and navigation behavior. That is why spatial categories, as determined by behavior, can be traced to human spatial abilities. Brian Harley and Irene Campari explored the cultural aspects in spatial reality through map making and map representations. Their papers discuss how GIS might impose western ideas of land (to be controlled) to other cultures. Several other papers discuss the differences in geographic and mathematical concepts of "neighborhood," "adjacency," and "contiguity" and how they impact the use of tools such as GIS. Other limitations include translating cognitive concepts into formal math for computer scientists to develop GIS programs that contribute to these differences.

Nelessen, Anton Clarence. 1993. *Vision for a New American Dream*. Chicago, Illinois: Planners Press.

This is a book of guidelines for preparing plans for small communities. It focuses on locating new communities and retrofitting existing ones. Land-use classification is mentioned even though its main purpose is presenting design fundamentals for small communities. The book touches on land-use classifications in chapter 8, which includes a sample zoning ordinance that uses a classification system to list permitted uses. Some land uses in that system have design requirements built into them. For example, there are items for: banks and other financial institutions, including drive-through facilities (provided these are located in the rear); restaurants, except drive-through facilities; and equestrian uses, limited to horses for personal use of a development's residents. Although the classification system is simple, with only a list of 20 categories overall, it is a good example of applying land-use classifications to design ordinances.

North Carolina Department of Natural Resources. 1990. *Superconductor/Supercollider Project*. Raleigh, North Carolina: North Carolina Department of Natural Resources.

North Carolina Geographic Information Coordinating Council (GICC). January, 1994. *A Standard Classification System for the Mapping of Land-use and Land Cover*. Online. Raleigh, North Carolina: North Carolina Geographic Information Coordinating Council. Available: <http://cgia.cgia.state.nc.us/gicc>. Last Accessed: May 1998.

North Carolina Southeast Chapter of the American Institute of Planners. 1958. *A Proposal for a Standardized Land Use Classification Project*. Raleigh, North Carolina: State of North Carolina, Department of Conservation and Development, Division of Community Planning.

The North Carolina Section of the American Institute of Planners developed this classification system for adoption by state agencies and local communities. The standard was commissioned by the Advanced Planning Section of the State Highway Commission and the Department of Conservation and Development's Division of Community Planning. Its purpose was to enable state agencies to create uniform land-use maps and data by using IBM punch cards. This is a four-level hierarchical system that has the following six top-level categories: transportation, production, business, service, residence, social and cultural, and open land. As an example, the manual also shows the a sample land-use map for Wilmington, N.C., with the classification scheme. The report also includes an alphabetical index of land uses. Grouping of land uses into categories is not fixed as it is in SLUCM, but is left to individual planning agencies.

Northern Kentucky Area Planning Commission. 1995. *Land Use Coding System PVA-Northern Kentucky Area Planning Commission*. Fort Mitchell, Kentucky: Northern Kentucky Area Planning Commission.

Ogden, C. K., and I. A. Richards. 1938. *The Meaning of Meaning*. New York: Harcourt Brace.

Ohio Department of Natural Resources, Remote Sensing Program. 1990. *Ohio Land-Use/Land Cover Information*. Columbus, Ohio: Ohio Department of Natural Resources.

Orange County. 1992. *Coding Scheme for Existing Land Uses*. Santa Ana, California: Orange County.

Ordway, Nicholas Ph. D., and William F. Smith. 1982. *Dictionary of Zoning Terms in Texas*. College Station, Texas: Texas Real Estate Research Center, Texas A&M University.

Ortiz, Alexandra. 1993. "The Determinants of Residential Population Density and the Effects of Land Use Regulation." Ph.D. diss., University of Illinois at Urbana-Champaign.

Palm Beach County Planning Division. 1995. *Categories for the Existing Land-Use Database*. West Palm Beach, Florida: Palm Beach County.

Palm Beach County Property Appraiser. 1990. *Property Use Codes*. West Palm Beach, Florida: Palm Beach County.

Pompei, Stefano. 1995. *Urban Development Right Equalization*. Bologna, Italy: Istituto Nazionale di Urbanistica.

The author proposed a land classification system based on valuations that could be used by local governments in Italy. This classification system, as proposed, would be applied nationwide to help

local governments identify the value of land based on its plan designation instead of its development potential. Under Italy's laws pertaining to just compensation, local governments could, under certain circumstances, pay only the "agrarian" value of land instead of its market value. The author suggests that local governments could employ such a technique to purchase private properties for public open space needs in newly developed urban fringes. The proposal would require all local governments to classify all private (or corporate) lands in their jurisdictions in one of four categories: Consolidated Urban Land, Potential Urban Land, Rural Belt, and Open Land. Consolidated Urban Land consists of existing cities, towns, and municipalities with urban densities. Potential Urban Land would consist of areas immediately adjacent to Consolidated Urban Land. This would include areas that are undeveloped now but may have potential for future annexation. Rural Belt is all lands around urban lands that are agricultural in use, including those that have the potential for agricultural use but currently serve as open space. The Open Land category will include all areas, beyond the Rural Belt, that have no urban development pressures.

*Porter Medical Associates Use Change Permit*, 139 Vt. 132, 423 A.2d 491 (1980).

Powdrill, E.A. 1961. "The Vocabulary of Land Planning." *The Estate Gazette* 41.

*Pratt v. Building Inspector of Gloucester*. 330 Mass 344, 113 N.E.2d 816 (1953).

Rogers, Golden and Halpern. August 1, 1986. *Land Use Planning Bulletin: Base Comprehensive Planning*. Online. Washington, D.C.: United States Air Force. Available: <http://www.afcee.brooks.af.mil/mmgpg/pages/reference/ref.htm>. Last Accessed: March 1998.

Rugg, Robert. 1995. "Defining Standard Features for Land Use Applications." *California GIS* 22, no. 3.

St. Louis, City of. 1994. *St. Louis Land Records Management System*. St. Louis, Missouri: City of St. Louis.

San Diego Association of Governments. 1968. *1968 Standard Land-use Codes*. San Diego, California: San Diego Association of Governments.

San Diego Association of Governments. 1995. *San Diego Region Generalized Existing Land-use Map*. San Diego, California: San Diego Association of Governments.

San Diego Association of Governments. 1995. *San Diego Region Generalized Land Ownership Map Categories*. San Diego, California: San Diego Association of Governments.

San Diego Association of Governments. 1995. *1995 Land-use Codes*. San Diego, California: San Diego Association of Governments.

San Diego Association of Governments. 1995. *1995 Property Use Codes*. San Diego, California: San Diego Association of Governments.

Sawicki, J.M. *Land Use Classification in British Columbia*. Victoria, British Columbia: Ministry of Agriculture and Food, Ministry of Environment.

- Schultz, Marilyn Spigel and Vivian Loeb Kasen. 1984. *Encyclopedia of Community Planning and Environmental Management*. New York City, New York: Facts on File Publications.
- Sims, Richard A. 1996. *Global to Local: Ecological Land Classification*. Boston, Massachusetts: Kluwer Academic Publications.
- Sioux City, City of. 1993. *Vision 2020: A Plan for Change*. Sioux City, Iowa: City of Sioux City.
- Sneath, Pete and Sokal R. 1963. *Numerical Taxonomy: The Principles and Practice of Numerical Classification*. San Francisco, California: H. Freeman.
- Southern California Association of Governments. 1990. *Aerial Land-Use Study, Land-Use Levels III/IV*. Los Angeles, California: Southern California Association of Governments.
- Southern California Association of Governments. 1968. *Classification of Land Use*. Los Angeles, California: Southern California Association of Governments.

The Southern California Association of Governments (SCAG) consists of 183 cities in six counties with a population of approximately 16 million. SCAG used a classification system for its 1990 aerial survey that consists of three levels, nine base classes, and about 125 codes. The primary data source for the classification system is aerial photography, with the smallest unit being a 20-to-100-meter grid.

- Sparks, Robert. 1958. "The Case for a Uniform Land Use Classification." *Journal of the American Institute of Planners* 24, no. 3: 174-78.

The author justifies the need for uniform land-use data for sound comparative research in urban and metropolitan planning. This article resulted from several meetings, held in 1958 by public planning agencies in the Detroit metropolitan area, that produced a uniform classification system. The author suggests that, with extensive statistics available for demographics, finance, labor, manufacturing, and business, the addition of uniform land-use information should make possible comparative analyses between regions, cities and communities. For an adequate regional land-use classification system, the author recommends comprehensive land uses and flexible categories. Comprehensiveness is explained as coding of activities in mutually exclusive classes and subclasses to identify all possible uses and include all possible activities. Such a system should be flexible enough to add additional classes or codes without disturbing existing ones. As a result, multiple codes can be grouped into unique classes for specific applications or unique local conditions. Although the author acknowledges that the SIC codes are not intended for land-use analysis, using the vacant digits along with extensions of the digits may surmount some of the initial problems of standardizing land uses. The author also recognizes using the activity-based SIC coding, even though many applications would require grouping of land uses and classes different from those based on activities. In an activity-based classification system, the major shortcomings are those related to rights-of-way, easements, and other land-rights classes that most planning applications require—hence, the uniform approach to land-use categories. The author recommends that the American Institute of Planners (which is now the American Planning Association and the American Institute of Certified Planners), would be the logical and appropriate organization to develop such a classification system. The author also predicted that federal programs might provide enough coercive pressure to make a federal land-use

inventory necessary. In the 1990s, this prediction has come true as several new standards have been developed at the federal level.

*State v. Mair*, 39 N.J. Super. 18, 120 A.2d 487 (App. Div. 1956).

Steuben County Planning Board. 1979. *A Glossary of Zoning Definitions*. Bath, New York: Steuben County Planning Board.

This is a document published by the Steuben County Planning Board in Bath, New York to supplement their zoning ordinance. It includes land use, lot descriptions, infrastructure and building structure terms as well as others found in the zoning ordinance. Several of land-use terms in the glossary have multiple definitions.

Tempe, City of. 1989. *General Plan 200, Projected Land-use Map Categories*. Tempe, Arizona: City of Tempe.

Topping Jaquess Consulting. 1997. *Information Sharing Project: Year 1 Report*. Pasadena, California: Topping Jaquess Consulting.

Toynbee, Arnold. 1966. "Man and His Settlements: A Historical Perspective." *Ekistics* (no. missing): 79-80.

United Nations Education and Science Cooperative Organization. 1997. *Modified UNESCO Classification*. Online. Boulder, Colorado: National Oceanic and Atmospheric Administration, Forecast Systems Laboratory. Available: <http://globe.fsl.noaa.gov/edu2/bmln8.html>. Last Accessed: 10 November 1997.

U.S. Air Force Center for Environmental Excellence. 1992. *People per Parking Space Land-Use Categories*. San Antonio, Texas: United States Air Force Center for Environmental Excellence.

----. 1992. *Suggested Land-Use Capability in Accident Potential Zones*. San Antonio, Texas: United States Air Force Center for Environmental Excellence.

U.S. Army. 1998. *Guide to Real Property Category Codes*. Washington D.C.: United States Department of Defense, Department of the Army, Headquarters.

U.S. Army Corps of Engineers. 1992. *Passaic River Basin Watershed Plan*. Washington, D.C.: United States Army Corps of Engineers.

U.S. Bureau of the Budget. 1987. *Standard Industrial Classification Manual*. Washington, D.C.: Government Printing Office.

U.S. Census Bureau. 1997. *The TIGER Page*. Online. Washington, D.C.: U.S. Census Bureau. Available: <http://www.census.gov/ftp/pub/geo/www/tiger>. Last Accessed: 1 December 1997.  
The U.S. Census Bureau's TIGER data home page provides a description of the Census Bureau's map data, available by year and location.

- U.S. Department of Agriculture, Natural Resources Conservation Service. 1998. *Land Evaluation and Site Assessment: A Guidebook for Rating Agricultural Lands*. 2<sup>nd</sup> Edition. Ankeny, Iowa: Soil and Water Conservation Society.
- U.S. Department of Energy. 1991. *Site Development Planning Order*. Washington D.C.: U.S. Department of Energy.
- U.S. Department of Housing and Urban Development. 1996. *Land Cover/ land-use Determinants, Impact Considerations*. Washington D.C.: U.S. Housing and Urban Development.
- U.S. Department of Labor. 1995. *Standard Industrial Classification (SIC) Codes*. Online. Seattle: University of Washington. Available: <http://weber.u.washington.edu/~dev/sic.html>. Last Accessed: 26 November 1997.
- This is a complete listing of all Standard Industrial Classification (SIC) codes. This is a code table developed by the U.S. Department of Labor to classify industries. The 1965 Standard Land-Use Coding Manual was based on this classification system. This site also has a search utility.
- U.S. Economic Classification Policy Committee and Statistics Canada, and Mexico's Instituto Nacional de Estadística Geografía y Informática. 1996. *North American Industry Classification System (NAICS)*. Online. Washington, D.C.: United States Census Bureau. Available: <http://www.census.gov/ftp/pub/epcd/www/naics.html>. Last Accessed: November 26, 1997.
- U.S. Fish and Wildlife Service, Department of the Interior. 1992. *Digitizing Conventions for the National Wetlands Inventory*. Washington, D.C.: U. S. Department of the Interior.
- U.S. Geological Survey. 1992. *Forum on Land Use and Land Cover: Summary Report*. Reston, Virginia: U.S. Geological Survey.

This report contains abstracts of presentations at the forum that was co-hosted by the U. S. Environmental Protection Agency and the U. S. Geological Survey under the auspices of the Federal Geographic Data Committee. The forum's purpose was to identify opportunities for sharing land-use and land-cover mapping tasks between federal, state, and local environmental programs. Findings from the report indicate that land-use and land-cover data span across a variety of applications that include local and state planning, ecological and global change monitoring, habitat assessment, wildlife management, enforcement, risk assessment, and waste management. The level of detail and accuracy of land-use/land-cover data used by these applications vary widely, and the collecting, sharing, and mapping of such data need to be standardized. Participants indicated a willingness to cooperate in developing such standards and adhering to them. Abstracts of presentations made at the forum highlight land-use and land-cover data usage in various federal, state, and local applications. Federal applications include the Coastwatch Change Analysis Program, the GAP Analysis of Biodiversity, National Water-Quality Assessment Program, National Resources Inventory Program, Environmental Monitoring and Assessment Program, Landsat Pathfinder, National Wetlands Inventory, and EPA Policy Studies. Abstracts dealing with state and local applications include those from the Maryland Water Resources Department, Florida's land-use/land-cover source coordination, Massachusetts GIS, California state programs, Illinois Natural History Survey, Georgia Mountains

regional development, New England land-use/land-cover technical requirements, the Atlanta Regional Commission's land-use and data analysis, the Ohio Department of Natural Resources' remote sensing program, and the state of Connecticut. Some abstracts included examples of classification and coding systems.

---. 1990. U.S. Geological Survey. *Digital Line Graph—Enhanced*. Reston, Virginia: United States Geological Survey.

--- n.d. *Requirements Analysis Results for Land Cover and Land Use Data*. Reston, Virginia: U.S. Geological Survey.

This report is a summary of the national land-cover and use data needs assessment survey, administered after the *USGS Forum on Land-use and Land Cover* (U.S. Geologic Survey 1992). More than 380 federal, state, and local planning agencies, as well as academic and private organizations, responded to questions about data collection and sharing, applications employing such data, and problems associated with the applications. The report presents in statistical tables the responses to each of the questions in the survey. Results show that more than half needed land-cover data to support programs, while only 14 percent were due to direct federal or state legislative mandates. More than two-thirds wanted conformity of data classification beyond their immediate geographic area. More than 80 percent use such data for change detection and research analysis, while only 58 percent felt they needed the data for mapping inventory. In terms of scale, more than half indicated their preferred scale is 1:24,000 to 1:59,000, and more than two-thirds wanted such data registered to a base map. For classifications, about one-fourth use Anderson classifications, another fourth use home-grown systems, 15 percent use state standards, and 3 percent use SIC. Questions about trade-offs in data quality, frequency of updates, accuracy, and related issues consistently showed that cost sharing is preferred to other alternatives.

University of Arkansas. 1997. *Arkansas Center for Advanced Spatial Technologies (CAST)*. Online. Fayetteville, Arkansas: University of Arkansas. Available: <http://www.cast.uark.edu/cast/info>. Last Accessed: 1 December 1997.

This site is for research, data development, new approaches to spatial data, and the development of new methodologies for analysis of these data, providing products to a variety of different audiences. The site includes GIS data aggregated by county pertaining to population, environment, and cultural resources in American land use.

University of California, Santa Barbara. 1997. *The Alexandria Project*. Online. Santa Barbara: University of California, Santa Barbara. Available: <http://alexandria.sdc.ucsb.edu>. Last Accessed: 30 December 1997.

The Alexandria Project is a consortium of researchers, developers, and educators, in the academic, public, and private sectors, exploring a variety of problems related to a distributed digital library for geographically referenced information. The site contains documents on Metadata structures as well as links to Metadata digital libraries.

Urban Renewal Administration, Housing and Home Finance Agency, and Bureau of Public Roads, Department of Commerce. 1965. *Standard Land Use Coding Manual: A Standard System for Identifying and Coding Land Use Activities. (SLUCM)*. Washington, D.C.: Government Printing Office.

In 1965, the Federal Highway Administration and the Department of Housing (then the Bureau of Public Roads and the Urban Renewal Administration, respectively) published SLUCM. The manual provided a detailed listing of land-use categories with numeric codes assigned to them. These categories were based on the 1962 Standard Industrial Classification (SIC). SLUCM codes became the defacto standard for planning in urban and suburban areas of the country. Although SLUCM was a voluntary standard, federal programs, nevertheless, adopted it widely. The manual was reprinted in 1972, but by the 1970s the manual was used less frequently because land-use planning in the country generally focused on short-term, small-scale projects. SLUCM provided a numeric coding scheme that used two, three, four, or more digits to identify land-use activities. In addition, from two to eight digits were used to identify ownership, type of structure the activity is housed in, and auxiliary use codes for secondary land uses. SLUCM's emphasis was on providing an exhaustive set of land uses derived from the SIC codes, with a limited set of attribute data to define further some of the land-use categories. The coding system included the nine general land-use classes: residential; manufacturing; transportation; communication and utilities; trade; services; cultural, entertainment, and recreational; resource extraction; and undeveloped land and water areas. The three attributes illustrated for the additional two to eight digits were ownership types, type of structures for residential uses, and crop types for farm uses.

*Vermont Statutes Title 24 § 4406(3)*.

Washoe County, Nevada. *Integrated Terrain Unit Mapping*. Reno, Nevada: Washoe County.

Whittier College. 1997. *Studio Project: Categories for the Environmental Justice Project*. Whittier, California: Whittier College.

Wilkins, Edward. 1941. "The Planning Approach to Categories." *The Journal of the American Institute of Planners* 7, no. 3: 20-24.

While working on a series of planning studies in eight towns and counties in Virginia, ranging in population from 2,000 to 80,000, the author realized the need for classifications not found in the Standard Industrial Classification (SIC) system. While the SIC-based systems are good for economic classifications, Wilkins felt that there is a need for categories based on: physical characteristics; potential for adverse impacts on adjacent properties; type of structure; land capacity; movement patterns; services demanded; services provided or rendered to the community; taxable values produced; ownership and access criteria; and other land categories based on pressure groups associated with these issues. Without offering a specific proposal, the author suggests that a specific uniform classification system based on impacts should be developed. This would aid in establishing and broadening the concerns of greenbelt towns, neighborhoods, etc. Otherwise, the classification system would be difficult for the profession to use.

Williams, Norman. 1985. *American Planning Law: Land Use and The Police Power, Volume 3A*. Wilmette, Illinois: Callhagan & Company.

- Winter Park, City of. Department of Community Development. 1991. *City of Winter Park, Florida, Comprehensive Plan*. Winter Park, Florida: City of Winter Park.
- Wisconsin Department of Natural Resources. 1995. WISCLAND: Land Cover Classes. Online. Madison, Wisconsin: Wisconsin Department of Natural Resources. Available: <http://www.dnr.state.wi.us/org/at/et/geo/wiscland/lc-cats.htm>. Last Accessed: February, 1998.
- Wittgenstein, Ludwig. 1953. *Philosophi Ai Investigation*. Oxford, England: Basil Blackwell.
- You, Jinsoo. 1996. *Implementation of Integrating Land Use and Transportation Models With Geographic Information System*. Champaign, Illinois: University of Illinois at Urbana-Champaign.
- Young, Paula, and Jack Triplett. 1996. *The Treatment of Auxiliary Establishments in Industry Classification Systems*. Online. Washington, D.C.: U.S. Dept. of Commerce, Census Bureau. Available: <http://www.census.gov/epcd/naics/ascii/auxiliary.txt>. Last Accessed: 27 October 1997.