



Background and Objectives

The objective of this document is to classify and describe the terrestrial and palustrine (wetland) plant communities of Pennsylvania. A plant community is an assemblage of plant populations sharing a common environment and interacting with each other, with animal populations, and with the physical environment. This classification does not include vegetation types characterized by a high degree of direct human influence (e.g. roadsides, agricultural fields, lawns, forest plantations, etc.). The term "*terrestrial and palustrine* plant communities" means that this classification is limited to terrestrial and palustrine environments. Aquatic and subterranean systems are not included.

This classification is a product of the Pennsylvania Natural Diversity Inventory (PNDI). PNDI is a partnership between the DCNR's Bureau of Forestry, the Pennsylvania Science Office of The Nature Conservancy, and the Western Pennsylvania Conservancy. PNDI's mission is to inventory and describe Pennsylvania's species of special concern, rare and exemplary natural communities, and outstanding geologic features. This information is used for conservation, research, development planning, and natural resource management. PNDI is Pennsylvania's Natural Heritage Program. The Natural Heritage Program is an international network for biological information. Data are collected and maintained using a uniform methodology. This uniform methodology and the network's integrated data management system make possible the assessment of the status of species and communities of concern across their entire range.

This classification system has been "crosswalked" or related to The Nature Conservancy's international vegetation classification system. This allows the user to compare Pennsylvania's community types to plant communities that occur throughout eastern North America. TNC's classification system is still being developed. Most crosswalks are to the 1996 draft "Community Alliances and Elements of the Eastern Region," (Sneddon, Anderson and Metzler, 1996). Contact TNC's Eastern Regional Office for the most recent version of their classification. Forested and woodland community types are also crosswalked to the Society of American Foresters' "Forest Cover types of the United States and Canada" (Eyre, 1980). A crosswalk is also provided to a draft version of "Natural Ecological Communities of Pennsylvania" (Smith 1991). The classification presented here replaces the previous draft classification developed for PNDI by Tom Smith of The Nature Conservancy.

This classification has a wide variety of potential uses. Its primary purpose is to act as a coarse filter in the

conservation of Pennsylvania's biological diversity. The Natural Heritage Program uses a coarse-filter/fine-filter approach to conservation. Protection of intact examples of all of the community types that occur in Pennsylvania acts as a coarse filter that may serve to protect the majority of the state's species diversity. Rare species, which are not effectively captured by the coarse filter, then receive individual attention. This is the "fine filter."

This document is intended to be usable by a variety of agencies and organizations. Its potential applications include mapping, environmental impact assessment, development planning, site selection for long term monitoring, preserve design and a variety of other activities related to the setting of priorities for conservation. It may also be useful in providing a common language to researchers and managers, as well as for educational purposes.

Concepts

For the purposes of this classification, a plant community is defined as an assemblage of plant populations sharing a common environment and interacting with each other, with animal populations, and with the physical environment. Most of these assemblages tend to occur repeatedly in the landscape under similar environmental conditions. No two examples of a community type are identical in their species composition or in their physical environment. The degree of similarity varies with the community type. Some community types are narrowly defined; examples of these community types will tend to be very similar to one another. Others are more broadly defined; examples of these types may vary considerably. The specificity of a community type depends on a variety of factors. In many cases, we lack sufficient information to define types more narrowly. In other cases, types are narrowly defined because of rarity, or because they occupy an unusually specific environment. Broadly defined types tend to be more common, less well studied, and tend to vary more continuously across their range of variability, making further division difficult.

The division of the natural world into discrete categories is an artificial process. The landscape displays almost infinitely complicated patterns of variation, occurring at many scales, and changing constantly over time. For practical reasons, it is useful to simplify this complexity, to assign it to "pigeonholes" that we can understand and work with. It should not surprise us that the natural world resists this reduction. Users of the classification should not expect a site to precisely resemble any of the community type descriptions given here. A community type represents a category, a range of variation, and the environmental conditions and characteristic species are



given for the most typical examples of that category. An individual example of a community type is not likely to contain all of the species listed in the description, and the description includes only a fraction of the species present in a community. Users will need to rely on their best judgment to determine which community type best describes a site. In some cases, a site may appear equally similar to two community types. In such a case, the site is best classified as intermediate between the two.

Plant communities may be described at many different scales—from the community in the fold of a leaf, to the "Northeastern Deciduous Forest Community." The scale of a classification system is driven by its intended use. The scale of this classification is intended to be appropriate for a variety of conservation activities including monitoring, management, mapping, and site conservation design.

Communities, like species, do not occur randomly scattered across the landscape, they generally form patterns of some kind; in some cases they form fairly organized groupings. These groupings are, in a sense, communities of communities. Under particular environmental conditions, certain groups of communities will tend to occur, often in a similar distribution pattern from site to site. These groups of communities are called here community complexes.

The community complex approach is reserved for cases in which patterns of community occurrence are fairly distinct and recognizable. This tends to be the case where environmental influences on plant species distribution are especially restrictive. In these areas, environmental factors so strongly shape patterns of species and community distribution that random factors become less confounding. In systems where environmental conditions are less restrictive, species and communities can more freely arrange themselves according to factors such as propagule recruitment and localized disturbance history. In these areas, repeating, environmentally driven patterns of community distribution may be difficult or impossible to recognize. For that reason, only a handful of community complexes are described. In future iterations of this classification it may be possible to describe additional complexes. In most cases, however, communities do not occur in sufficiently distinct, repeating patterns to be included in the complex section.

The community complex section of this classification therefore represents a selection of special situations rather than a parallel classification system or a level in the classification hierarchy. Just as any given community

example will not contain all the species associated with that type, and may contain some which appear incongruent or transitional, so do examples of community complexes vary in composition.

This classification effort is ongoing. Our understanding of the patterns of variation in the natural world is constantly improving; as we gather more information and come to better understand these patterns, the classification will be modified to reflect that understanding, as well as changes in Pennsylvania's ecology and vegetation over time. For the most recent classification, contact one of the PNDI partners.

Data sources

Much of the information presented here represents the collective expertise and experience of the PNDI ecology staff. The remainder has been compiled from literature review, PNDI field forms, other Heritage data, County Natural Area Inventories, limited field investigation, and consultation with relevant experts. In a few cases, types are based on quantitative analysis of inventory data. In most cases, we have not yet had the opportunity to study community types in such detail.

Organization

The community types are first divided into two major systems, palustrine (wetlands) and terrestrial (non-wetlands). These systems are then divided into physiognomic categories (e.g. forest, woodland, shrubland). A dichotomous key is provided following this introduction to assist the user in determining which system and physiognomic category best describe a given site. One additional division is made within some physiognomic categories. In categories dominated by woody plants (forests, woodlands, and shrublands), the division is based on the phenology of the dominant species (conifer, broadleaf, or combined conifer-broadleaf). In herbaceous wetlands, the division is between persistent and non-persistent vegetation. This hierarchical arrangement allows the user to classify a site at a coarser level of detail if that is more appropriate, or if a specific community type cannot be determined.

Community types are distinguished by physiognomy, hydrology, species composition, ecological processes, and distribution. Descriptions include a list of characteristic species. These species may or may not be dominant; they are either commonly associated with the community type or they serve to distinguish that type from other closely related types. Where the community type occurs under specific, known environmental conditions, those conditions are described. Environmental descriptions may include information on soils, geology,



hydrology, chemistry, hydrology, and disturbance. In many cases we do not yet have sufficient information to describe the environmental processes associated with different community types. Each community is briefly compared to other related community types with which it might be confused. The Pennsylvania range of each community type is given in terms of ecologically defined regions, these regions are shown on the map entitled "Ecological Regions of Pennsylvania." A selection of references is provided for most types. Each type is crosswalked (related) to TNC's International Vegetation Classification, and in the case of forested or woodland types, to the Society of American Foresters' Forest Cover Types.

Community type names are merely labels, and are not meant to describe community types in and of themselves. Where possible, the name usually includes one or more of the dominant species. Where species names are separated by a dash ("-") the species are commonly both present. Where species names are separated by a slash ("/") they are not typically found together. Where a species name appears in parenthesis, that species is perhaps not typical, but is dominant or sufficiently important on some sites that it effectively replaces one of the other species listed in the type name. Where the community type does not have clear dominants or where those dominants do not serve to distinguish it from other community types, other descriptors such as range and environmental information are used. Types cannot be understood from the names alone; the entire description must be read.

Descriptions of the complexes follow the community types. The complex descriptions include a list of the community types associated with that complex, an environmental description, the Pennsylvania range for that complex, and a list of selected references. A glossary of terms, a list of references, and a map of ecological regions of Pennsylvania are provided at the end of this document.

Vascular plant nomenclature follows Rhoads and Klein (1993). Bryophyte nomenclature follows Crum and Anderson (1981). Species not native to Pennsylvania are indicated by a superscript "I." The aggressive species *Phalaris arundinacea* (reed canary-grass) and *Phragmites australis* (common reed) are marked with a superscript "(I)", as their native status is unclear. Pennsylvania species of special concern are indicated by a superscript "S."

PNDI welcomes feedback from users of this classification, please send comments or data to the following address.

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