

Vermont Agency of Natural Resources
Guidelines for the Conservation and Protection of State-Significant Natural Communities
October 21, 2004 Version

Approved as Guidelines by ANR Lands Stewardship Team October 18, 2005

Purpose

The purpose of this document is to provide an overview of natural community ranking used by the Agency of Natural Resources' Nongame and Natural Heritage Program and to provide guidelines for the conservation of significant natural communities through management of Agency lands and the Agency's environmental review process. Agency lands are sustainably managed to conserve biological diversity and to provide timber resources, wildlife habitat, and outdoor recreation, in accordance with Agency policies and any legal constraints that may have come with State acquisition of the land. Potential conflicts may arise between any of these management goals and these guidelines are intended to help in resolving these conflicts that apply to natural community conservation. Natural communities are one element of biological diversity, which also encompasses species, ecosystems, ecological process, and genetic variability. It is also the intent that these guidelines provide a greater level of predictability on how natural community conservation will be accomplished by the Agency through environmental review.

Background

A **natural community** is an interacting assemblage of plants and animals, their physical environment, and the natural processes that affect them. As these assemblages of plants and animals repeat across the landscape wherever similar environmental conditions exist, it is possible to describe these repeating assemblages as **natural community types**. Interest in the natural community-based approach to conservation and land management has increased dramatically in recent years. Natural communities provide a powerful tool for describing the landscape, developing sound management plans for land, determining conservation priorities, and increasing our understanding of the natural world.

The Agency's Nongame and Natural Heritage Program currently recognizes 80 upland and wetland natural community types in Vermont (Thompson and Sorenson 2000)¹. Each of the 80 natural community types has been assigned to one of three broad categories based on its size, its distribution across the landscape, and the specificity of its association with particular environmental conditions. These scales of community distribution are referred to as matrix, large patch, and small patch and are defined more specifically and listed for each community type in the attached Table 1.

Each community type is also assigned a **State Rank** that describes the **rarity** of that type in Vermont. State Ranks range from S1 (extremely rare) to S5 (common and widespread) and are assigned based on the number of known occurrences of the type, the total area occupied by the type, and the degree of threat to the type. For example, Calcareous Riverside Seep is an S1 community type that occurs only in areas of calcareous ground water seepage over flood-scoured

¹ Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont. E.H. Thompson and E.R. Sorenson. 2000. Published by The Nature Conservancy and Vermont Department of Fish and Wildlife, distributed by University Press of New England.

bedrock river shores, whereas Northern Hardwood Forest is an S5 community type that occurs throughout the state at elevations below 2,500 feet. See the attached Table 1 listing the State Rank for each natural community type currently recognized and the Notes to Table 1 defining State Ranks.

Each occurrence of a natural community that is visited and evaluated by the Agency's Nongame and Natural Heritage Program is also assigned an **Element Occurrence Rank**. The Element Occurrence Ranks summarize the **quality** of the occurrence and its probability of persistence over time, and range from A (excellent) to D (poor). Individual ranking specifications are being developed for each of the 80 natural community types and will be used to rank the quality of each occurrence. These ranks are based on an assessment of the **size** and **current condition** of the natural community, and the **landscape context** in which the community occurs. Each of these three ranking factors is assigned an appropriate weight based on the specific community type and its characteristics. Large size, condition reflecting minimal human disturbance, and a surrounding landscape with intact natural communities and minimal fragmentation are all factors that contribute to a high Element Occurrence Rank. In general, the higher the rank, the more likely it is that the community will be viable over long time periods and the higher its conservation value. See the attached example of the Element Occurrence Ranking Specifications for Northern Hardwood Forest. The Element Occurrence Ranking Specifications under development by the Agency are consistent with the methodology developed by NatureServe, the conservation organization that provides guidance to the international network of Heritage Programs.

Determination of State-Significance of Natural Communities

At the core of the work by the Agency's Nongame and Natural Heritage Program is the database containing information on occurrences of natural communities and populations of rare plant and animal species. For natural communities, occurrences are considered **State-Significant** and are tracked in the database if they meet a combination of State Rank and Element Occurrence Rank ratings as described below:

- S1 or S2 community types with an Element Occurrence Rank of A, B, or C
- S3 or S4 community types with an Element Occurrence Rank of A or B²
- S5 community types with an Element Occurrence Rank of A.³

The underlying assumption in this sequence of categories is that the rarer the community type, the greater the conservation value that is placed on lower quality occurrences. For the rare Calcareous Riverside Seep, all occurrences of excellent (A) to fair (C) quality are considered State-Significant. In contrast, only the excellent (A) occurrences of the common Northern Hardwood Forest are considered State-Significant. Natural communities that meet these combinations of rarity and quality represent the best occurrences of their community types in Vermont. Natural community occurrences that do not meet these categories may still be considered State-Significant, but this determination will need specific justification.

² C-ranked S3 and S4 natural communities are tracked in the database but are not considered State-Significant. The rationale is that if the C-rank is based on a degraded current condition, recovery or restoration of the community over time will result in assignment of a higher Element Occurrence Rank and a determination of State-Significance.

³ B-ranked S5 natural communities are tracked in the database but are not considered State-Significant for the same reason as described in footnote 2.

In addition to these categories, a site may be considered State-Significant if it contains an **association of natural communities** that characterizes a particular part of the landscape and for which ecologically intact examples are rare or declining in the state. The natural communities in these associations are typically closely linked by ecological characteristics of the site, such as topography, soils, hydrology, or natural disturbance. In these cases, the association of natural communities is the State-Significant feature, not necessarily all the individual natural communities that are components of the association, although at least one component natural community should be State-Significant. Examples include: Lake Champlain associations of Deep Rush Marsh, Lakeshore Grassland, Lakeside Floodplain Forests, Sand Beach, and Sand Dune, all closely tied to the ecological processes of flooding, wave action, wind, and sand deposition; and associations on calcareous hills of the Champlain Valley, including Mesic Maple-Ash-Hickory-Oak Forest, Dry Oak-Hickory-Hophornbeam Forest, and Temperate Calcareous Outcrop and Cliff, all tied to the warm, dry to mesic calcareous substrate of these hills. NatureServe and the network of state Heritage Programs are currently developing specific standards for identifying, ranking, and tracking these associations of natural communities.

The Nongame and Natural Heritage Program has been conducting statewide inventories of specific natural community types since 1993 and will continue this effort. As statewide inventories are completed, the information is used to revise, as necessary, the natural community classification, the State Rank of a community type, the Element Occurrence Ranking Specifications, and the Element Occurrence Rank of any State-Significant examples of the community type.

Conservation of State-Significant Natural Communities on State Land

On State land, the Agency provides an example and sets the standard on how natural communities can be managed and conserved. It has long been known that many excellent occurrences of rare to uncommon natural community types occur on Agency land, but only through recent Agency land inventory and mapping efforts is it now clear that these lands also contain some of the State's best occurrences of common natural community types. The abundance of State-Significant common natural communities on Agency land attests to the high quality of past management of these lands, as well as to their large size and the unfragmented landscapes in which they occur.

In general, the Agency's management goal for State-Significant natural communities is to conserve, enhance, or restore the ecological integrity of the communities through active or passive management practices that either maintain or increase the Element Occurrence Rank of the communities. This translates to maintaining or increasing the size, current condition, and landscape context of the community. For rare, ecologically sensitive, and very small natural communities, this will generally mean setting the land aside from future active management – a strategy that is already commonly practiced. On occasion, restoration activities (such as control of invasive exotic species or planting native species) will be necessary for degraded community types like floodplain forests, clayplain forests, and sandplain forests in order to raise the Element Occurrence Rank by increasing the size or condition of the community.

For more common and larger communities, there should be ample opportunity to balance natural community conservation with active management. Practices that will maintain or enhance ecological integrity include removal or control of invasive exotic species, forest management to

favor species and structural characteristic of mature natural communities, introduction of natural disturbance regimes, and establishment of undisturbed buffers or ecological reserves⁴. These practices promote excellent and diverse hunting, fishing, trapping, and nature observation opportunities. The goal of maintaining ecological integrity of a natural community or association of natural communities will be balanced with other complementary or conflicting uses of the land, such as wildlife habitat management, timber harvesting, and recreation, and will respect any conditions that came with acquisition of the Agency land parcel.

More details on evaluating the potential effects of various management activities on State-Significant natural communities are provided in the "Guidelines" section below and also the Element Occurrence Ranking Specifications for each natural community type.

Conservation of Natural Communities through Environmental Review

Under Act 250 review Criterion 8, projects may be approved if it is shown that they "will not have an undue adverse effect on ... rare and irreplaceable natural areas." The Agency's Nongame and Natural Heritage Program has a record of seeking protection for highly significant natural communities under this rare and irreplaceable natural area criterion. All State-Significant natural communities and associations of natural communities occurring on projects under Act 250 review are evaluated by the Agency as potential rare and irreplaceable natural areas. If it is determined that a clear case can be made as to why the occurrence constitutes a rare and irreplaceable natural area, this information will be presented to the District Environmental Commission or Environmental Board. In general, it is expected that those natural communities which may be considered rare and irreplaceable natural areas are a subset of those considered State-Significant. State-Significant examples of rare natural community types (S1 and S2) will typically fit the definition of rare and irreplaceable natural area. State-Significant examples of more common natural community types (S3, S4, and S5) will need to have exceptional characteristics (such as the presence of old growth forest patches or very large and unfragmented size) in order for the Agency to pursue conservation of the community as a rare and irreplaceable natural area.

The protection of State-Significant natural communities using the rare and irreplaceable natural area criterion or a decision in the Act 250 process designating a community as a rare and irreplaceable natural area does not mean that the area will be off limits to all activity. The assessment of what constitutes an undue adverse effect on a rare and irreplaceable natural community or association of natural communities is closely tied to the Element Occurrence Rank of that occurrence. In general, an activity that would lower the Element Occurrence Rank would be considered adverse, but the permanence and extent of an adverse effect must also be weighed in determining whether the effect is undue. A proposal to fill 500 square feet of a small, sensitive, very rare Rich Fen may be argued to be an adverse and undue effect, whereas a proposal to harvest timber from 500 acres of an excellent, 3,000 acre example of a Montane Spruce-Fir Forest (S3) may be considered neither undue nor adverse. More details on this are provided in the "Guidelines" section, below.

⁴ A process for establishing a network of ecological reserves has not been completed by the Agency and is separate from the purpose of this document. The general concept is that ecological reserves are large areas, with primarily passive management and a focus on maintaining or restoring ecological processes at landscape scales. Ecological reserves are one way in which natural communities can be conserved.

Guidelines for Evaluating Alterations to Natural Communities

In order to effectively evaluate the significance of a human alteration to a natural community, the characteristics of both the natural community and the alteration must be clearly understood. The following criteria and guidelines should be considered. These factors have been incorporated into the Element Occurrence Ranking Specifications for each natural community type.

Natural Community Characteristics

1. The **rarity of a natural community type** is a primary consideration. Each occurrence of a rare community type (S1 and S2) has very high conservation value. In general, these communities should be protected absolutely and management should be restricted to restoration activities and establishment of appropriate buffer zones. Examples of restoration management include removal of invasive exotic species from a Rich Fen, planting native trees to expand a remnant Clayplain Forest, and conducting prescribed burns in a Pine-Oak-Heath Sandplain Forest.
2. The **size of a natural community occurrence** relates both to its Element Occurrence Rank and to its ability to absorb alterations. In general, a large occurrence of a natural community will be given a higher Element Occurrence Rank than a small occurrence, other factors being equal. A large occurrence is more likely to be able to absorb an alteration without significant degradation of ecological integrity (or lowering of the Element Occurrence Rank), although this will clearly depend on the type of alteration. In general, matrix community types can accommodate more alteration or management than large patch communities and much more than small patch community types.
3. The **current condition** of a natural community describes its maturity, species composition, biological structure, ecological processes, and physical and chemical factors. In general, for forests, a community that has minimal human disturbance, a species composition and community structure that are characteristic of mature conditions, and ecological processes (including natural disturbance regimes) functioning will be given a high Element Occurrence Rank. For those natural communities that are maintained in early successional stages by natural disturbance, the continued functioning of these disturbance regimes and the species composition and structure that they create will result in assignment of a high Element Occurrence Rank. Examples of these disturbance-maintained natural community types include Alluvial Shrub Swamps and many shoreline communities, which are kept in early successional stages by periodic flooding and/or ice scouring. Making decisions about how to evaluate the effects of a proposed alteration and how to maintain or improve the current condition of a State-Significant natural community may be the most difficult task in this process, especially for matrix community types. In general, for a matrix forest with a high current condition rating, that high rating can be sustained or enhanced by activities that maintain at least the minimum area for an "A" condition rank (500 acres for Northern Hardwood Forest) in a mature condition, and also maintain the "B" condition of the surrounding portion of the community (see the attached Northern Hardwood Forest ranking specifications). For timber management in a State-Significant Northern Hardwood Forest, this may translate to little or no harvesting in the minimum size area (500 acres) to maintain an "A" condition rank and selective harvesting that emulates natural disturbance processes

(area and frequency) in surrounding areas. More intensive management in a portion of the community may also be compatible with maintaining the overall "A" Element Occurrence Rank.

4. The **landscape context** of a natural community describes the physical structure, the extent, and the condition of the surrounding landscape. A landscape context that is highly connected by intact natural communities, with little or no fragmentation by roads or other barriers, and with species interactions and natural processes occurring across the landscape is highly rated. Activities that fragment the landscape surrounding a State-Significant natural community will degrade the community and the natural processes that support it. Typical fragmenting features include canopy opening roads, agriculture, and development.
5. Natural communities vary in their **sensitivity to human alteration**. The degree to which a community is sensitive relates primarily to how easily the natural processes that sustain the community can be changed. Many small patch community types are especially sensitive as they occur in settings where several ecological processes or environmental conditions come together in a very precise way. For example, Rich Fens occur in basins with small surface watersheds and the presence of calcium-rich ground water discharge. Minor alterations of the quantity or quality of water entering fens can drastically change the species composition of these fragile wetlands. Similarly, Sand Dunes form along Lake Champlain primarily in sheltered south-facing coves where there is a source of sand that can be moved by lake currents, waves, and wind. Onsite or offsite alterations can interrupt these processes and result in loss or deterioration of the dunes. In contrast, some community types, such as cliffs, outcrops, and some matrix forests like Northern Hardwood Forests are relatively resilient, although even in these communities, trampling of sparse vegetation or fragmentation by roads can lower their quality. A partial list of factors that should be considered in assessing the sensitivity of a community include:
 - specific hydrologic conditions
 - soils that are shallow or wet and susceptible to damage
 - importance and width of a naturally vegetated buffer
 - susceptibility to changes in disturbance regime (flooding, fire, wind...)
 - susceptibility to invasion by exotic species.

Characteristics of the Alteration

1. The **area of alteration**, in combination with the size of the natural community is an important consideration. The larger the percentage of a significant natural community that is altered, the more detrimental the alteration.
2. The **severity of the alteration** can be evaluated in terms of the degree to which it affects natural processes, or in terms of its permanence. Those alterations that affect key natural processes and are likely to be permanent are clearly the most damaging to the ecological integrity of the natural community. Construction of a dam or parking lot would be expected to significantly alter natural processes and these alterations are permanent. In contrast, selective logging of many forest communities can result in relatively minor alterations of natural process and there is a high potential for recovery, especially logging that is designed to emulate the scale and frequency of natural disturbance processes.