

Community Evaluation Methodology

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Abstract

The Ontario Natural Heritage Information Centre (NHIC) collects and maintains information on occurrences of significant vegetation communities in the province. Significant occurrences include those of communities considered to be rare in the province as well as high-quality examples of non-rare communities. The conservation rank (S-rank) of vegetation communities are determined using standard criteria developed by The Nature Conservancy (TNC) in the United States. Communities are ranked from S1-S5, with S1 being the most rare, and S5 the most common. Only those communities ranked S1, S2 and S3 are considered to be rare. The ranking is based on the number of community occurrences, the total area of the community, and the geographic range it occupies in the province.

The quality of the community occurrence, referred to as Community Element Occurrence Rank, is also an important consideration. The occurrence rank is based on three considerations: size, condition and landscape context. Vegetation communities occur at different scales on the landscape. They may form a landscape matrix, or occur as large patches or small patches in an unaltered landscape. By considering the size of the existing community, in relation to its landscape patch size in an unaltered landscape, a size quality can be determined. The size quality can then be compared to the landscape context to determine a combined size/landscape context score. This score is then compared to a community quality score to determine a final community occurrence rank. The highest rank is A, this refers to a community which is large enough to maintain ecological processes and species interactions such that it is expected to have excellent predicted viability over time. A rank of B has good predicted viability over time, and a C rank has fair viability.

Together, the community conservation rank and occurrence rank are useful tools in conservation planning initiatives. In gap analyses where community representation is considered, not only can the occurrence of a community within an area be considered, but so can its quality. The selection of candidate areas for protection as parks or nature reserves should be weighted toward those with high-quality community examples. On the other hand, knowledge of the presence of poor or degraded communities, especially of rare types, can help focus restoration and rehabilitation efforts.

The Natural Heritage Information Centre (NHIC) is a provincial organization dedicated to protecting Ontario's biodiversity. It does this through its core function, which is to generate a permanent and dynamic atlas and data bank on the character, distribution and conservation status of natural areas, critical flora and fauna, vegetation communities and special features in Ontario.

The NHIC is part of a hemispheric network of heritage centres that are established in six Canadian provinces, Atlantic Canada, each of the 50 American states and in 14 Latin American and Caribbean countries. The centres all follow a common methodology for collecting, recording, evaluating, maintaining and storing information for the purpose of biodiversity conservation, which was developed by The Nature Conservancy (TNC) in the United States.

One of the great strengths of the common methodology shared by this natural heritage network is that information can be readily shared between programs. The central TNC office in Arlington, Virginia, receives status information for species and vegetation communities from each program annually, and by reviewing these data, is able to assign a global conservation status for each. Heritage centres can also work together sharing and collecting data for regional assessments, to maximize biodiversity conservation efforts.

Recently, ecologists in the Conservation Science Division of The Nature Conservancy and in various heritage centres have developed a community evaluation methodology for use by heritage centres. The NHIC collects and maintains information on communities that are rare in the province, as well as high-quality examples of communities that may not be rare. By using this evaluation methodology, communities may be assessed and ranked to prioritize and guide conservation efforts.

Vegetation community evaluation is based on two key items:

- **Conservation Rank** - a designation of rarity
- **Occurrence Rank** - a designation of quality

Conservation Rank

The NHIC applies the following conservation ranks to vegetation community types:

- **S1** - Extremely rare in Ontario; usually five or fewer occurrences in the province, or very few remaining hectares.
- **S2** - Very rare in Ontario; usually between five and 20 occurrences in the province or with few remaining hectares.
- **S3** - Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with some large remaining hectares.
- **S4** and **S5** are considered to be common and widespread in Ontario

These conservation ranks are based on a number of considerations, primarily the estimated number of occurrences of the community – known as the community element since it is an ‘element of biodiversity’ – the total areal extent, and the distribution range within the province. The following letter codes are assigned to each factor, and together they are used to derive the conservation rank.

Estimated Number of Community Element Occurrences

- A 1-5 occurrences
- B 6-20 occurrences
- C 21-100 occurrences
- D >100 occurrences

In some cases, such as when communities like tallgrass prairies have disappeared to the point that they now exist mostly as tiny fragments, only larger (i.e., > 2ha) occurrences are considered in the ranking.

Estimated Community Element Areal Extent

- A <1,000 ha
- B 1,000 - 5,000 ha
- C 5,000 - 25,000 ha
- D >25,000 ha

Estimated Range of Community Element

- A Very small range in province, < 3% of provincial area
- B Narrow range, < 10% of provincial area
- C Moderately widespread, < 50% of provincial area
- D Widespread, > 50% of the provincial area

Community Element Occurrence Rank

The community element occurrence rank indicates the quality of the occurrence.

The basic element occurrence ranks include:

- A excellent predicted viability
- B good predicted viability
- C fair predicted viability
- D probably not viable

There are also some additional ranks that may be assigned in certain cases:

- E verified to be extant (not enough information to rank properly)
- H historical
- F failed to find (site visit was made, not found)
- X extirpated
- <blank> unranked

Element occurrence ranks are based upon the following variables:

- Size
- Condition
- Landscape Context

Size Considerations

Communities may be categorized into three broad functional groups based on their historical or current pattern of occurrence. The functional group to which a community belongs affects the assessment of the size quality rating. These groups are identified as:

- Matrix
- Large Patch
- Small Patch

The following general definitions and examples of these community categories have been developed to date. However, these specifications have only been recently developed, and only for a few community types. Work is ongoing by ecologists to develop specifications for the wide variety of communities that have been described in the TNC vegetation classification system for North America.

Matrix Community

- forms extensive and contiguous cover (2,000-40,500 hectares, as much as 75-80% of natural vegetation in an ecoregion)
- typically have wide ecological tolerances

Size specifications for Eastern Hemlock - Yellow Birch Mesic Forest (Faber-Langendoen, 1997):

- A Very large (>400 ha)
- B Large (40-399 ha)
- C Moderate (4-39 ha)
- D Small (<4 ha)

Large Patch Community

- forms large areas of uninterrupted cover (20-2,000 ha, as much as 20% of natural vegetation in an ecoregion)
- associated with environmental conditions that are more specific than those of matrix communities

Generic size specifications (D. Faber-Langendoen, 1997):

- A Very large (>260 ha)
- B Large (65-260 ha)
- C Moderate (15-65 ha)
- D Small (<15 ha)

Small Patch Community

- forms small, discrete areas of cover (<20 ha, generally less than 5% of an ecoregion)
- occur in very specific ecological settings

Size specifications for Great Lakes Coastal Meadow Marsh [a.k.a. Interdunal Panne, Shoreline Fen] (Comer, 1987):

- A Very large (>16 ha)
- B Large (8-16 ha)
- C Moderate (1-8 ha)
- D Small (<1 ha)

Community Condition

Many considerations determine the community condition, including many that are dependent on the community itself. Examples are:

- Are there "old growth" conditions present?
- Is the overstory and understory structure intact?
- Is the native species composition intact?
- What is the extent of introduced species in the community?
- Are ecological processes integral to the community occurring? (e.g., fire)
- What is the extent of human-induced disturbance?
- Are hydrological regimes still 'natural'?

Landscape Context

- A highly connected – surrounding area is largely intact natural vegetation with species interactions and natural processes occurring across communities
- B moderately connected – surrounding area is moderately intact natural vegetation; landscape includes partially disturbed or semi-natural communities
- C moderately fragmented – surrounding area is combination of cultural and natural vegetation with barriers to species interactions and natural processes
- D highly fragmented – almost entirely surrounded by agricultural or urban land use

Determination of the community element occurrence rank is a two-step process. First, using a table, the community size is compared against the landscape context to determine a joint size/landscape context rating. The following table illustrates this. In this hypothetical example, the size rating is A, landscape context is B and condition is C.

| | | Landscape Context | | | |
|------|---|-------------------|----------|---|---|
| | | A | B | C | D |
| Size | A | A | A | B | B |
| | B | B | B | B | C |
| | C | B | C | C | C |
| | D | C | C | D | D |

The next step is to compare the combined size/landscape context rating against the condition rating:

| | | Size / Landscape Context Average | | | |
|-----------|---|----------------------------------|---|---|---|
| | | A | B | C | D |
| Condition | A | A | A | B | C |
| | B | A | B | B | C |
| | C | B | C | C | D |
| | D | C | D | D | D |

The final rank applied to this community is then “B”.

Together, the community conservation rank and element occurrence rank are useful tools in conservation planning. In gap analyses where community representation is considered, not only can the occurrence of a community within an area be considered, but so can its quality. The selection of candidate areas for protection as parks or nature reserves should be weighted toward those with high-quality community examples. On the other hand, knowledge of the

presence of poor or degraded communities, especially of rare types, can help focus restoration and rehabilitation efforts.

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