INDICATOR: EXTENT, QUALITY AND PROTECTION OF ONTARIO'S RARE ECOSYSTEMS

STRATEGIC DIRECTION: Enhance Resilience

TARGET: 10. By 2015, the status of species and ecosystems of conservation concern in Ontario is improved.

THEME: State of Ecosystems and Species – Rare Ecosystems

Background Information:

Ontario's diverse ecosystems include some that are of conservation concern due to their limited distribution, such as prairies and savannahs (prairies with scattered trees), alvars (flat open limestone habitats with thin soil),and freshwater coastal dunes. Although they are generally small in size, these habitats support many of Ontario's endemic species, and are home to species and groups of species that are uncommon or absent from other ecosystems in the province. As such, they are fundamentally important for the conservation of biodiversity in the province.

The extent of prairie and savannah habitat in Ontario has been greatly reduced – in the Mixedwood Plains Ecozone, only a fraction (2-3%) remains (2,200ha; Rodger 1998) and this is threatened by habitat loss, invasive alien species, and succession to forest due to fire suppression. Globally rare alvar communities occur only in the Baltic region of Estonia and Sweden, in western Russia, and within the Great Lakes basin and the Interlake region of Manitoba of North America. Ontario contains 75-80% of the North American total, including sites on the Bruce Peninsula, Manitoulin and Pelee islands, near Napanee, Smith's Falls and the Carden Plain. Alvar ecosystems in Ontario face similar threats as prairie and savannah habitats. Great Lakes sand dunes make up the world's largest collection of freshwater coastal dunes (SOLEC 2009). Ranging from the high forested dunes and linear dune ridges commonly backing sand beaches, to active, moving dune fields, sand dunes can be found along the coasts of all the Great Lakes. Freshwater coastal dunes are fragile ecosystems that are easily affected by human activities.

The distribution and status of these rare ecosystems is tracked by Ontario's Natural Heritage Information Centre based on vegetation communities (assemblages of plant species with a consistent composition, structure and habitat). To date, more than 1,000 occurrences of vegetation communities that are considered to be globally rare by NatureServe have been documented in Ontario (Figure 1). Seventy-two percent of these globally rare communities occur within the Mixedwood Plains Ecozone. There are likely additional rare communities in the Ontario Shield and Hudson Bay Lowlands ecozones that have yet to be documented.

This indicator assesses the total area and quality of prairie, savannah, alvar, and dune ecosystems in Ontario, and the area of each that is legally protected in the province.

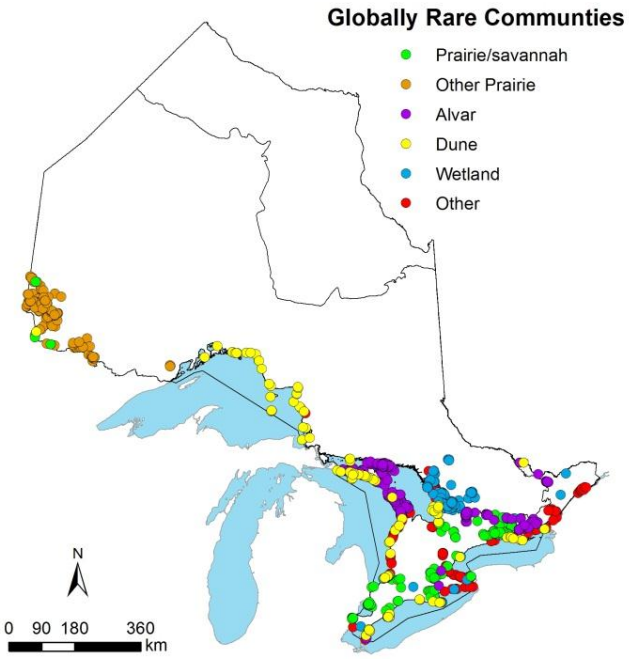

Figure 1. Distribution of globally rare vegetation communities in Ontario (*n* = 1,175).

Data Analysis:

Analysis for this indicator was based on detailed spatial data available through the Natural Heritage Information Centre. The areas of rare vegetation communities were summed to assess the total area of prairie, savannah, alvar and dune ecosystems in Ontario (Figure 2). The boundaries of vegetation communities in these rare ecosystems was overlain with the boundaries of protected areas (Provincial and National Parks, National Wildlife Areas and Conservation Reserves) using GIS to determine the proportion of each rare ecosystem type found in protected areas. Rare communities in protected areas are sometimes subjected to disturbance and threats from human use, but are generally not subject to development and the same level of threats as non-protected areas. The total area and proportion of protected area for alvar and freshwater coastal dune communities have been refined from data originally reported in the *State of Ontario's Biodiversity 2010* report based on new survey information (alvars) as well as detailed analysis of orthophotography (dunes - Bakowsky and Henson 2014). Prairie/savannah communities assessed in this indicator are limited to those on deep soils and the analysis does not currently include prairie communities on shallow soils that are found in northwestern Ontario ('other prairie' category in Figure 1).

In addition to the total area and level of protection, the status of vegetation communities was assessed using element occurrence ranks that are based on a recent assessment by the Natural Heritage Information Centre. Extant vegetation communities were assigned element occurrence quality ranks from A - D (Table 1) based on NatureServe data standards. Ranks were based on an examination of the size, condition and landscape context of vegetation communities (Table 2). A full description of the ranking methodology can be found in Henson and Bakowsky (2014). For each rare ecosystem type, the total number and area of element occurrences assigned to each quality rank were tallied and plotted (Figure 3).

It is important to note that the proportion of each rare ecosystem in protected areas is based on legally protected areas and does not include privately owned conservation lands held by conservation organizations. Conservation lands account for important additional protection for some of these

ecosystems, but have not been assessed due to the lack of consolidated, comprehensive information on their spatial boundaries. For instance, an assessment of alvar ecosystems by the Nature Conservancy of Canada showed that conservation lands contribute to the protection of an estimated additional 960 ha, almost equal to the amount in legally protected areas (D. Kraus, Nature Conservancy of Canada, personal communication).

Table 1. Element occurrence quality ranks assigned to vegetation communities in Ontario's prairie, savannah, alvar and dune ecosystems.

Quality rank	Description
A	excellent predicted viability
B	good predicted viability
C	fair predicted viability
D	poor estimated viability

Table 2. Description of factors considered when assessing quality of vegetation community element occurrences (see Henson and Bakowsky 2014).

Factor	Component
Size	Area of occupancy
Condition	Development/maturity (stability, old-growth)
	Ecological processes (degree of disturbance by logging, grazing, changes in hydrology or natural fire regime)
	Abiotic physical/chemical factors (stability of substrate, physical structure, water quality)
Landscape Context	Landscape structure and extent (pattern, connectivity e.g., measure of fragmentation/patchiness, measure of genetic connectivity)
	Condition of the surrounding landscape (ie. Development/maturity, species composition and biological structure, ecological processes, abiotic physical/chemical factors)

- Download summary data for rare vegetation communities

Results:

Trend: Baseline **Data Confidence:** High **Geographic Extent:** Mixedwood Plains/Ontario Shield

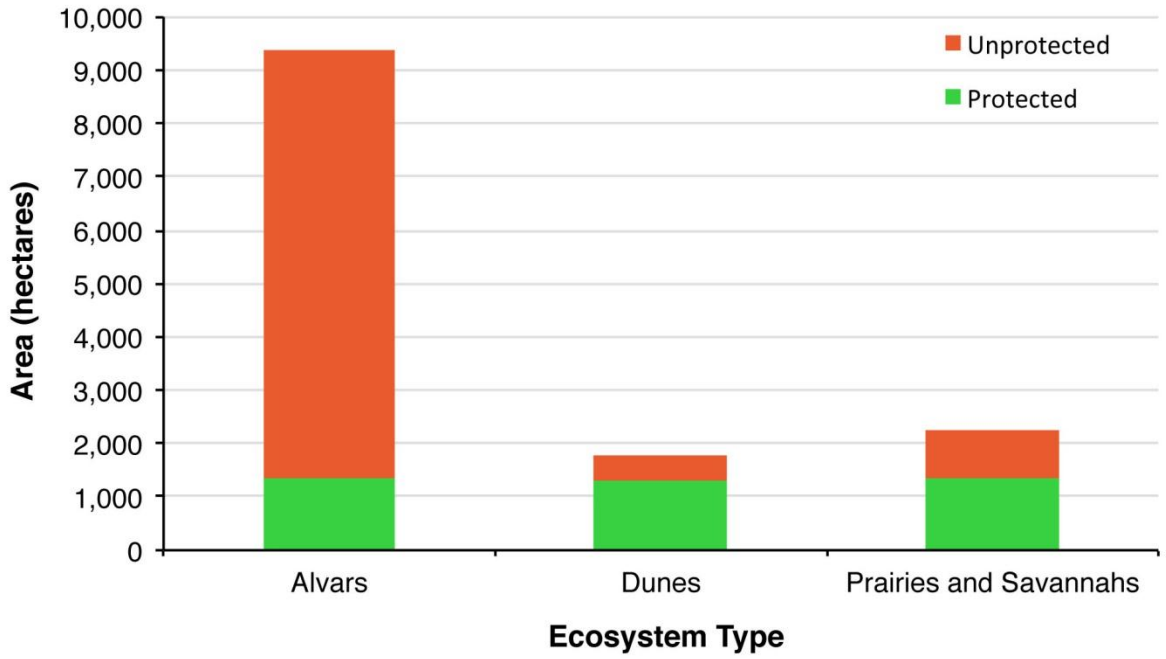

Figure 2. Total area of alvar, dune and prairie/savannah ecosystems in Ontario showing amount of each type that is legally protected (source: NHIC database, OMNRF, Peterborough, ON).

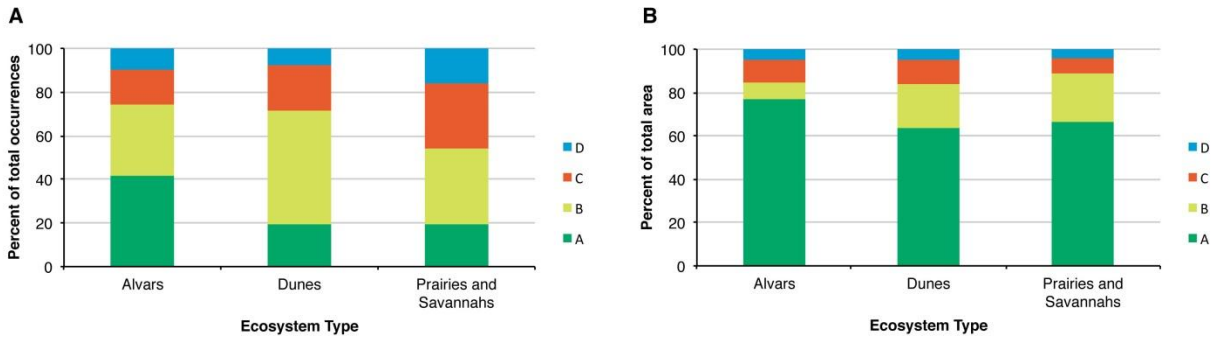

Figure 3. A) Proportion of vegetation community occurrences with quality ranks A-D in alvar, dune and prairie/savannah ecosystems; B) Proportion of area with quality ranks A-D in alvar, dune and prairie/savannah ecosystems (source: NHIC database, OMNRF, Peterborough, ON).

Status:

- Alvar ecosystems cover more area than the other rare ecosystem types, but only 14% of their total area is legally protected. It is estimated that conservation lands contribute to protecting and additional 10% of Ontario's total alvar area.
- More than half (61%) of the remaining prairie/savannah ecosystems are legally protected, while 75% of freshwater coastal dune systems are in protected areas.
- More than half of the occurrences of rare vegetation communities in all three ecosystems types were ranked as A or B meaning they have good to excellent predicted viability. More than 80% of the total area falls into the A and B ranks. This difference reflects the higher quality of larger areas and the consideration of size when assigning ranks.

Links:

Related Targets: 13. By 2020, at least 17 % of terrestrial and aquatic systems are conserved through well-connected networks of protected areas and other effective area-based conservation measures.

Related Themes: Pressures Ontario's Biodiversity – Habitat Loss

Web Links:

Natural Heritage Information Centre https://www.ontario.ca/environment-and-energy/natural-heritage-information-centre

References:

Bakowsky, W.D., and B.L. Henson. 2014. Rare communities of Ontario: freshwater coastal dunes. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Queen's Printer for Ontario, Peterborough, ON.

Henson, B.L., and W.D. Bakowsky. 2014. Plant community ranking methodology: alvars, dunes, prairies. Natural Heritage Information Centre, Ontario Ministry of Natural Resources and Forestry, Peterborough, ON. [Available at: Available at: http://sobr.ca/_biosite/wp-content/uploads/Henson-and-Bakowsky-2014_Plant-Community-Ranking-Methodology-Alvars-Dunes-Prairies.pdf]

Rodger, L. 1998. Tallgrass communities of southern Ontario: A recovery plan. Report prepared for World Wildlife Fund Canada and the Ontario Ministry of Natural Resources.

State of the Lakes Ecosystem Conference (SOLEC). 2009. State of the Great Lakes 2009. Technical report prepared by Environment Canada and the United States Environmental Protection Agency. [Available at: http://www.epa.gov/solec/]

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