Plant Community Ranking Methodology: Alvars, Dunes, Prairies

In support of the State of Ontario's Biodiversity Report, 2015 Indicator: Extent and Condition or Rare Ecosystems
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Observation refinement
Existing Biotics records were based on centroids and buffer distances. These observations were refined to polygons from reporting mapping and/or remote imagery. Biotics records were also reviewed to ensure the most appropriate community type was assigned and the records remain valid and have not been destroyed.

Additional community observations were digitized from report mapping, acquired project shapefiles or from remote imagery to delineate known community extent and complement the existing Biotics records. Existing spatial data was verified with current imagery available through MNRF ArcGIS Servers.

Tabular information (feature attributes) were completed for each of the observations including the element ID, Elcode, ELC Code (if available), observer, source, date and other associated descriptive notes etc.

Four vegetation types in northern Ontario include prairies species were not included in the summary statistics for the 2015 report. They are the Bur Oak Basic Treed Rock Barren Type, Bur Oak – Saskatoon Berry Dry Deciduous Woodland Type, Big Bluestem-Junegrass Dry Rockland Prairie and the Dry Fescue Mixedgrass Prairie Type. The Bur Oak and Rockland types occur on shallow soils and the dry fescue mixedgrass type are separated from the tallgrass vegetation on deeper soils.

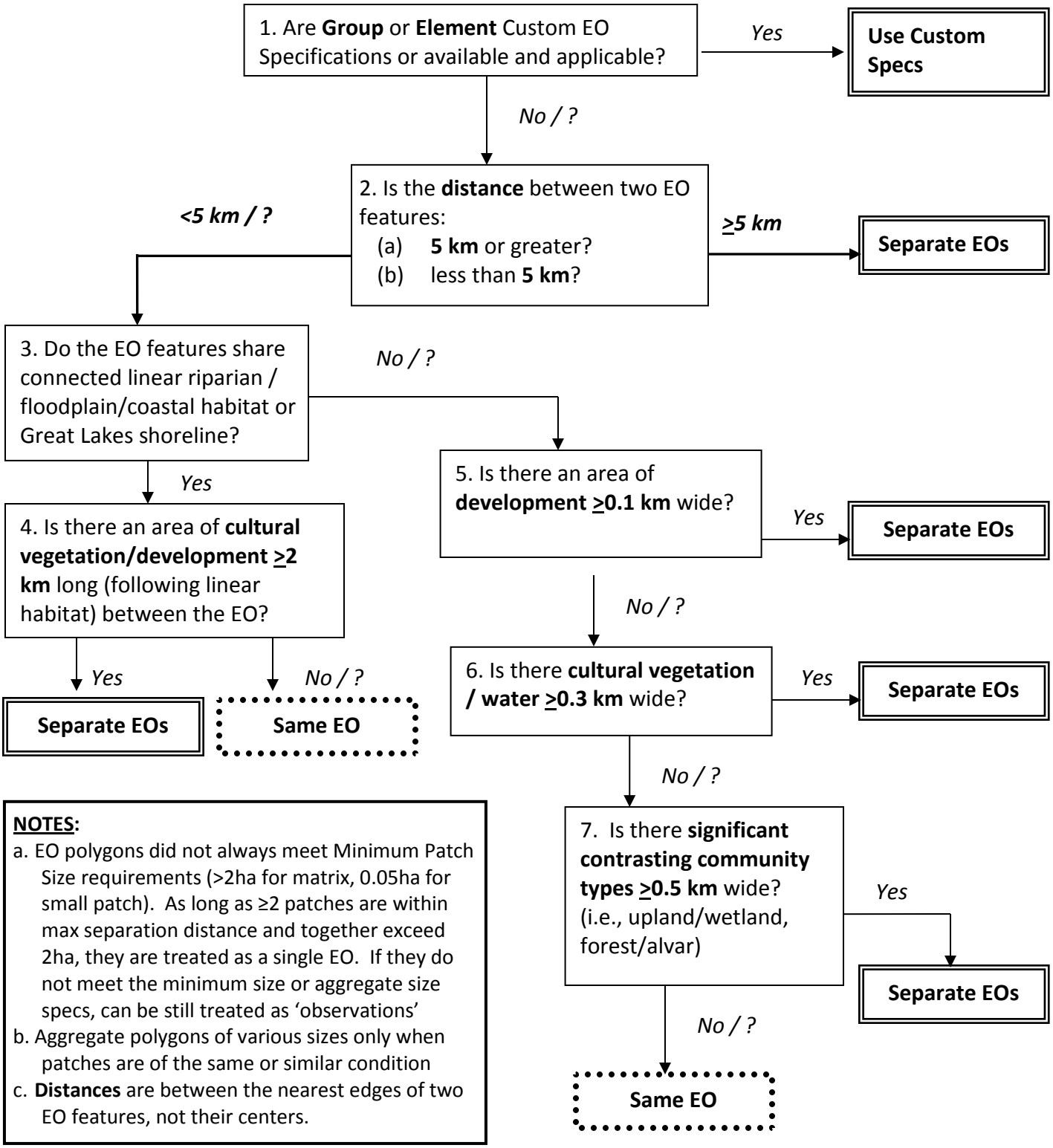
EO delineation
The refinement of community observations improved the ability to aggregate observations into element occurrences. Plant community element occurrence delineation in Ontario was adapted from the Ecological Element Occurrence Delimitation Guidance (NatureServe, 2012).

The two modifications to the NatureServe guidelines included the addition of the Great Lakes shoreline as a connected linear feature to aggregate polygons, and the identification of significant contrasting community types rather than identifying only between upland and wetland. See Figure 1 for more details.

Distances between EO features along the Great Lakes shoreline were measured based on the actual distance along the shoreline rather than the straight line distance between two features. Significant contrasting community types were identified to include more than upland vs. wetland communities. For example, forests and alvars are significant contrasting communities that should be used to help delineate between EOs regardless of their landscape position.

Figure 1: Plant Community Element Occurrence Delineation in Ontario, October 2014

Adapted from Ecological Element Occurrence Delimitation Guidance, October 2012



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EO Ranking

Once the community polygons were aggregated into EO polygons based on the EO delineation criteria for Ontario, EO ranking can be assigned. EO ranks represent the relative value of an EO with respect to other EOs for that same element or community type. Community element occurrence ranks were adapted from the Community Evaluation Methodology (Bakowsky, 1997). For communities, the term viability is referred to the sum of the species viability of those present in the community and their ecological processes.

In general, element occurrence ranks identify in NatureServe methodology (see NatureServe EO Data Standard, 2002) include:

A excellent predicted viability
B good predicted viability
C fair predicted viability
D poor estimated viability

Other ranks that can be assigned in certain cases include:

E verified to be extent (not enough information to rank properly)
H historical (lack of recent field information to verify continued existence)
F failed to find (purposeful search at site and element was not found)
X extirpated (documented destruction or pervasive evidence of eradication)

The estimated viability, or EO rank, is determined by three EO rank factors that reflect what is currently known about the EO. These factors are size, condition and landscape context. EO rank factors and components are described below based on NatureServe EO Data Standards (2002).

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 eg. 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)

Size Considerations

Plant communities were categorized into four groups for each broad community type. The EO size and distribution data for each type was examined and classified using standard classification methods in ArcGIS to determine the most appropriate class ranges. The classification scheme used for each broad community type was the *geometrical interval* which creates class breaks for continuous data creating a balance between middle values and extreme values to produce more consistent intervals. Note that the Great LaCloche Island alvar is exceptionally larger than range of the other alvars. The geometrical intervals were determined for alvars excluding the Great LaCloche Island size in the algorithm to provide a more appropriate interval range.

Type	Rating	Patch Size Description	Geometrical interval
Alvars	A	very large*	> 90.8
	B	large	16.5 - 90.8
	C	medium	2.65 - 16.5
	D	small	0 - 2.65
Dunes	A	very large	> 72.3
	B	large	9.8 - 72.3
	C	medium	1.25 - 9.8
	D	small	0 - 1.25
Prairies and Savannahs	A	very large**	>26.5
	B	large	4.1 – 26.0
	C	medium	0.565 – 4.09
	D	small	0 – 0.56

*geometrical interval analysis excluded Great LaCloche Island alvar for range determination.
**geometrical interval analysis excluded the Pinery tallgrass woodland for range determination.

Community Condition

There are many considerations in determining community condition, many of which are dependent on the community itself.

- 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

The landscape context takes into account the landscape structure and extent as well as the condition of the surrounding landscape.

Rating	Description
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

To determine a community EO rank, first determine the size/landscape context rating by comparing the size against the landscape context in the table below. The following tables use the example of a community EO which has been determined to have a size rating of A, landscape context of B, and condition of C.

Determining the size/landscape context rating:

		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

Then the size/landscape context rating is compared with the condition rating resulting in the EO rank.

		Size / Landscape Context Rating			
		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 EO rank applied to this community is then B.