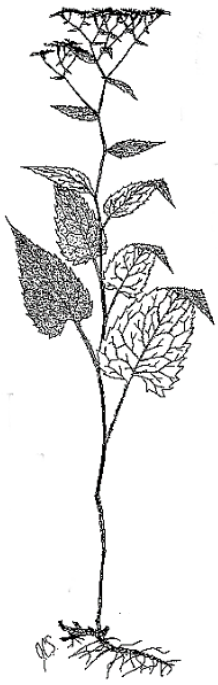
COSEWIC
Assessment and Update Status Report

on the

White Wood Aster
Eurybia divaricata

in Canada



THREATENED
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

COSEPAC
COMITÉ SUR LA SITUATION
DES ESPÈCES EN PÉRIL
AU CANADA

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

COSEWIC 2002. COSEWIC assessment and update status report on the white wood aster *Eurybia divaricata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 23 pp.

Previous report:

Sharp, M.J., C.J. Manderson and W.J. Crins. 1995. COSEWIC status report on the white wood aster *Eurybia divaricata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 33 pp.

Production note: COSEWIC would like to acknowledge Melinda J. Thompson for wirting the status report on the White Wood Aster *Eurybia divaricata*, prepared under contract with Environment Canada.

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Également disponible en français sous le titre Rapport du COSEPAC sur la situation de l'aster divariqué (*Eurybia divaricata*) au Canada

Cover illustration:
White Wood Aster — illustration by Semple et al. 1996.

Catalogue No.CW69-14-51-2003E-IN
ISBN 0-662-34316-6-8

COSEWIC
Assessment Summary

Assessment Summary – November 2002

Common name
White Wood Aster

Scientific name
Eurybia divaricata

Status
Threatened

Reason for designation
Geographically restricted and fragmented populations at risk from continued habitat loss, invasive species, deer browsing and recreational activities impacting populations along trails.

Occurrence
Ontario and Quebec

Status history
Designated Threatened in April 1995. Status re-examined and confirmed in November 2002. Last assessment based on an update status report.

COSEWIC
Executive Summary

White Wood Aster
Eurybia divaricata

Species information

Eurybia divaricata is a fall-flowering herbaceous perennial. Deeply serrated upper leaves and narrowly heart-shaped lower leaves characterize this species. Flat-topped clusters of small flower heads also distinguish it. The flower heads are yellow and purple in the center with white rays.

Distribution

Eurybia divaricata occurs in Canada and the United States. This species is generally common throughout its main range in the Appalachian Mountains, and from New England south to Georgia and Alabama. In Canada, *Eurybia divaricata* occurs in scattered populations in the Niagara Region of southern Ontario and in a few woodlots in southwestern Quebec.

Habitat

This species inhabits dry to moist deciduous woodlands with well-drained soils and relatively open canopies.

Biology

Flowering occurs in early August to September. Fruiting occurs in mid to late September. This species spreads clonally through rhizomes.

Population sizes and trends

In Canada there has been an increase in the reported number of populations since 1995. Number of reported locations and population sizes (number of stems) within the populations in Ontario have increased. Populations in Quebec have not been monitored consistently, but it appears that although the number of reported locations has increased, the number of viable populations is low and may be decreasing.

Limiting factors and threats

The major threats to this species are habitat loss, grazing by deer and consumption by weevils, tramping and possibly invasive species.

Special significance of the species

This species is one of the least common in the Asteraceae and is at the northern edge of its range in Ontario and Quebec.

Summary of status report

There are only 25 reported locations of *Eurybia divaricata* in Canada, 15 in Ontario and 10 in Quebec, many of which have not been monitored for several years. Fewer than 10,000 plants have been documented. Of the populations that have been confirmed recently, all but two are threatened to some degree, either by habitat destruction and development, trampling, small population size or environmental factors such as competition with invasive species and deer browsing or weevil consumption. Many of the sites in Ontario are located on public lands and do have some protection through management, but the majority of Quebec populations are on private lands where they are at risk.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.
** Formerly described as “Not In Any Category”, or “No Designation Required.”
*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

Environment Canada Environnement Canada
Canadian Wildlife Service Service canadien de la faune
Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

Update
COSEWIC Status Report

on the

White Wood Aster
Eurybia divaricata

in Canada

2002

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SPECIES INFORMATION

Name and Classification

Scientific Name:	*Eurybia divaricata* (L.) Nesom
Pertinent Synonyms:	*Aster divaricatus* L.
	Biotia macrophyllus (L.) DC. var. *divaricata* (L.) DC.
	Aster corymbosum Aiton
English Names:	White wood aster
	Heart-leaved Aster
	Serpentine Aster
Family Name:	Asteraceae (Compositae)
English Family Name:	Aster

All species of *Eurybia* have been treated as members of *Aster* in North American floras. The nomenclature is a significant shift in what had been standard, but it is strongly supported on the basis of morphology because the species are not genetically related to members of the Eurasian genus *Aster*. Members of sect. *Eurybia* (*Biotia*) have heart-shaped basal leaves, while those of other sections have oblanceolate or obovate basal leaves. Nesom divided subgenus *Eurybia* into five sections (Semple et. al, 1996).

Description

Eurybia divaricata is a fall-flowering herbaceous perennial. It emerges from rhizomes (horizontal, underground stems), and grows in colonies. It is characterized by deeply serrated upper leaves and narrowly heart-shaped lower leaves (Figure 1). Flat-topped clusters of small flower heads also distinguish it. The disk florets in the flower heads are yellow and purple with white rays surrounding. For a more detailed description, please refer to The Asters of Ontario (Semple et. al, 1996), Manual of Vascular Plants of Northeastern United States and Adjacent Canada (Gleason and Cronquist, 1991) or to the original COSEWIC report (Sharp et al., 1995).

Traditional treatments place most asters in the genus Aster L. However, during the last decade analyses of morphology, chloroplast DNA restriction fragment length polymorphisms and ITS sequence data, and on going karyotype studies have all demonstrated that asters are polyphyletic and members of a number of very distinct phylads within the tribe (Nesom, 1994).

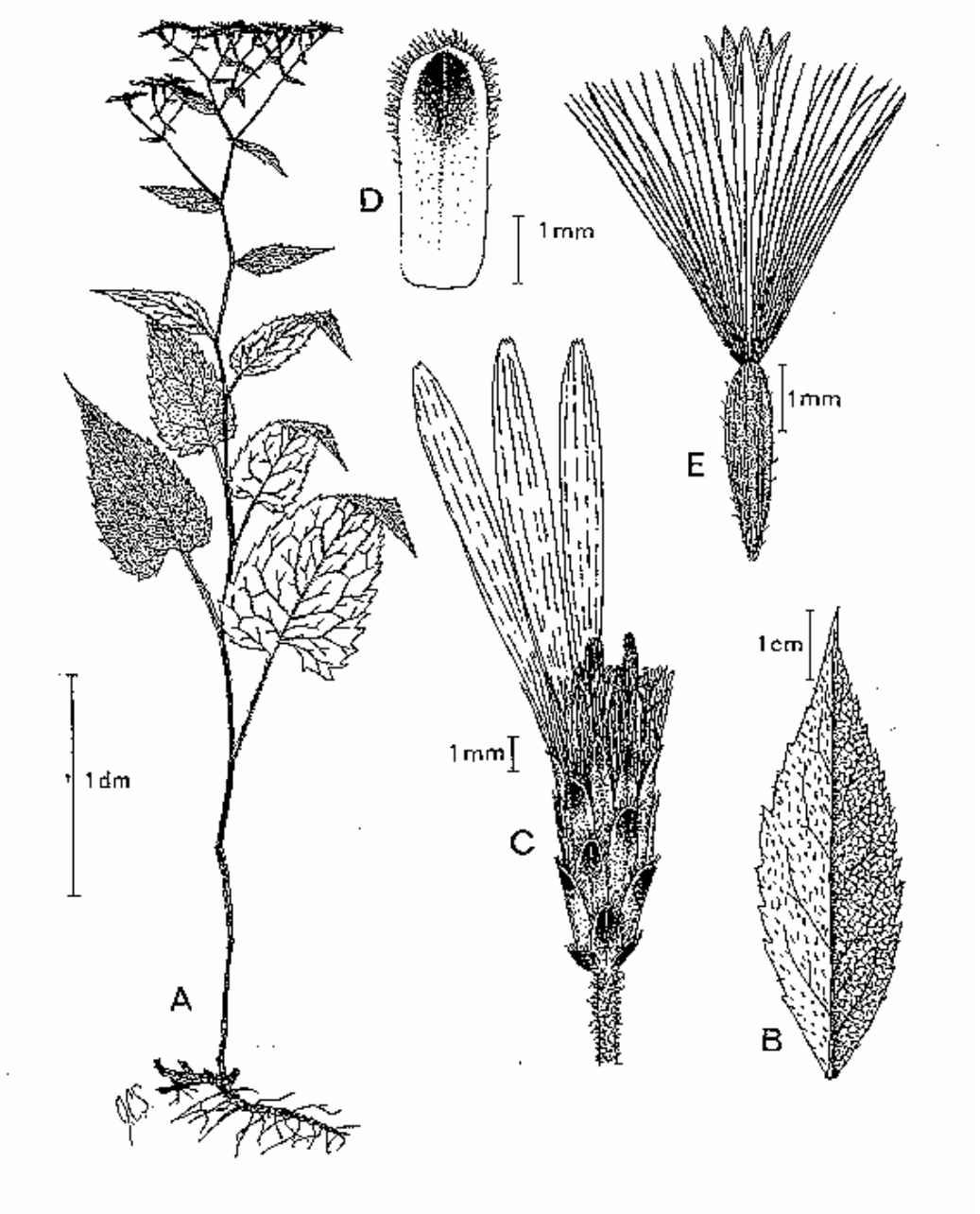

Figure 1. Illustration of *Eurybia divaricata* (Semple et al., 1996).

DISTRIBUTION

Global range

Eurybia divaricata occurs in Canada and the United States. This species is generally common throughout its main range in the Appalachian Mountains, and from New England south to Georgia and Alabama (Figure 2).

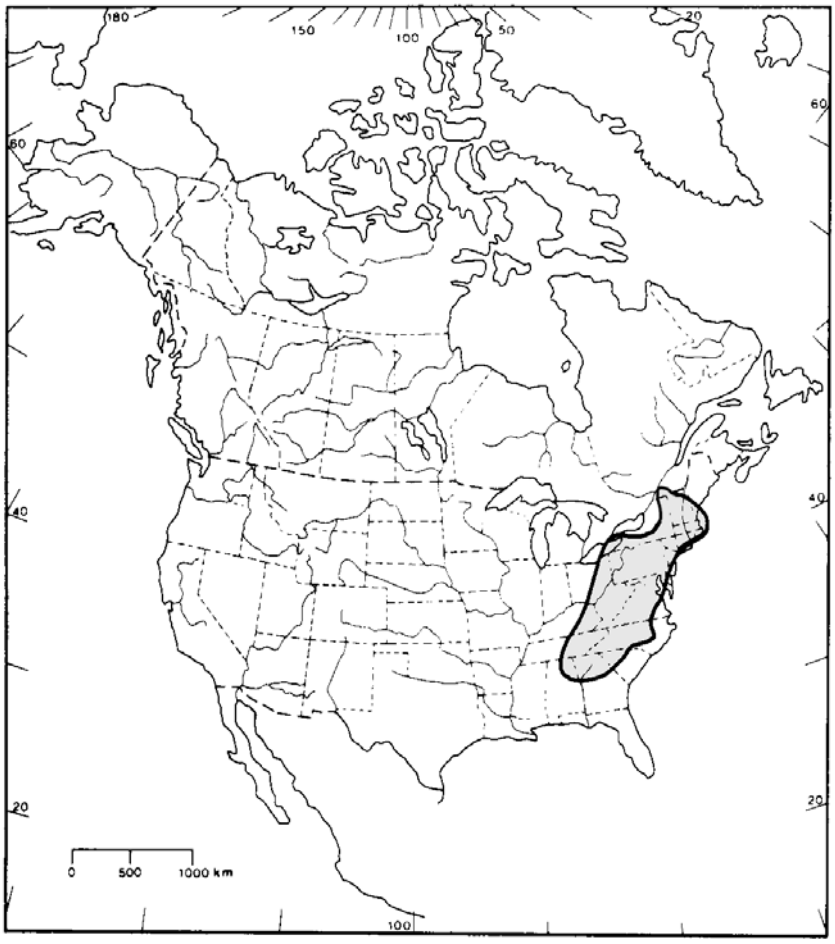

Figure 2. North American distribution of *Eurybia divaricata* (adapted from Argus et. al, 1987).

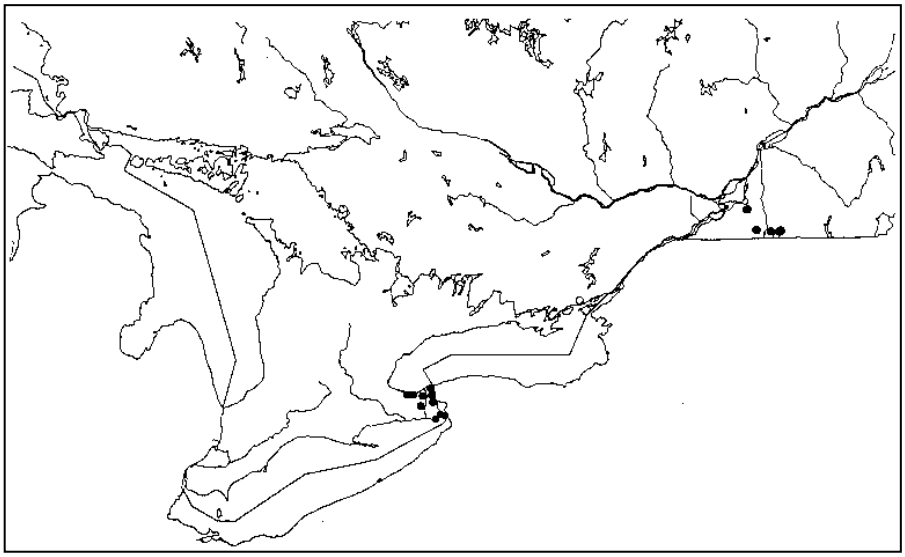

Figure 3. Distribution of *Eurybia divaricata* in Ontario and Quebec.

Canadian range

In Canada, *Eurybia divaricata* occurs in scattered populations in the Niagara Region of southern Ontario and in a few woodlots in southwestern Quebec (Figure 3). *Eurybia divaricata* is near the northern limits of its range in Ontario and may never have been common or widespread here (R.O.M., 1997). Currently, there are 15 confirmed extant populations in Ontario:

- **Crescent Estates Woodlot**
- **Culp's Woods**
- **Dufferin Island**
- **Fonthill-Sandhill Valley ANSI (Area of Natural and Scientific Interest)**
- **Marcy's Woods**
- **Miller Creek Swamp Woodlot**
- **Nelson Quarries**
- **North Pelham Valley ANSI**
- **Oakhill Forest**
- **South Fort Erie**
- **South Fort Erie 2**
- **Short Hills Provincial Park**
- ♦ Terrace Creek
- ♦ Cataract Woods
- **St. John's Conservation Area**
- **Summer Street Woodlot**
- **Two Mile-Four Mile Creek ANSI**
- ♦ Niagara Shores C.A.
- ♦ Department of National Defense

There have been 10 locations reported in Quebec, 6 of them consisting of isolated clones with very few stems:

- Venise-en-Quebec
- Frelighsburg
- ♦ Petit Pinacle
- ♦ St-Armand Centre
- Saint-Blaise
- Mont St-Gregoire
- Colline Spruce
- Saint-Armand
- Philipsburg
- Mont Rougement
- Mont Pinacle

This makes for a total of 25 locations in Canada, although 4 populations (all located in Quebec) have not been confirmed for at least 10 years.

HABITAT

Habitat requirements

Eurybia divaricata is a plant of open, dry deciduous forests. All Ontario stations occur within the Niagara section of the deciduous forest region (Rowe, 1972). These forests are dominated by sugar maple and American beech, but contain red, white and black oaks, shagbark hickory, basswood and Carolinian affiliates. This plant requires well-drained soils, although it seems to do well in wetter years (such as 2000). It may be suggested that this plant also likes some disturbance, as it seems to grow along trails in the majority of the populations in Ontario.

Populations of Eurybia divaricata in the Niagara region occur within the Niagara Fruit Belt and Lake Erie Counties climatic regions of southern Ontario. This is one of the warmest regions in southern Ontario, with the longest growing season. The Ontario sites are also in the Humid High Moderate Temperate Ecoclimatic Region of the

Moderate Temperate Ecoclimatic Province (Ecoregions Working Group, 1989). This ecoclimatic region is characterized by humid warm to hot summers and mild snowy winters. Mean daily temperatures are above zero degrees Celsius from April through November. Monthly precipitation is usually greater than 70 mm and is distributed fairly evenly throughout the year.

Quebec populations tend to occur in maple-beech forests with associates of bitternut hickory and hop hornbeam. All populations are on well-drained soils or on the slopes of rocky hills. Many of the woodlots in which this species occurs have been disturbed by some small-scale logging, which may have opened the canopy and allowed the populations to flourish.

The Quebec sites fall within the Humid Mid-Cool Temperate Ecoclimatic Region of the Cool Temperate Ecoclimatic Province. These populations are at the northern limit of the species range. This region is characterized by warm summers and mild winters with mean daily temperatures above zero degrees Celsius from April through November. Monthly precipitation is usually greater than 75 mm (Ecoregions working Group, 1989).

Singleton 2001 found that Eurybia divaricata is very rarely found in postagricultural forests. In addition, Singleton found that stem density of Eurybia divaricata declined with distance from old woods (Singleton et al, 2001).

Protection/ownership

Since the designation of *Eurybia divaricata* as a COSEWIC Threatened species in 1995, no steps have been taken to ensure the survival of this species in Ontario. Two of the populations are located within a Provincial Park, two are located within Conservation Areas, and one is located on the property of a public parks commission. All other populations are located on private property, though two are located within provincial ANSI's (privately owned).

In Quebec, all of the populations are located on private property except for the Philipsburg population which is located at a migratory bird sanctuary owned by the Province of Québec Society for the Protection of Birds.

BIOLOGY

The genus *Eurybia* is characterized by a flat-topped capitulescence, broad and apically rounded phyllaries, and terete ovaries. The phyllaries typically are ciliate on the margin and have a basally truncate green zone at the tip *(i.e*., shaped like a thumb nail). The pappus bristles are sometimes thickened near the apex but are of nearly uniform length. In some species, the leaves are both cordate and borne on a petiole, whereas in others they are sessile and taper to the base (Haines, 2001).

Physiology

Eurybia divaricata is a fall-flowering herbaceous perennial. It prefers open, dry, deciduous forests with well-drained soils. The phenology of Eurybia divaricata can be generalized as follows (Sharp et al., 1995):

Floral bud break:	Early August
Capitulescence opening:	Mid-to-late August
Full flowering:	1st to 3rd week of September
Early fruiting:	Mid September

Reproduction/Dispersal

Shoots of *Eurybia divaricata* develop from the tips of rhizomes and form dense colonies. Seeds of *Eurybia divaricata* are wind dispersed with migration rates of 0.2 to 0.3 m per year (Singleton et al., 2001). This is considered very low (Singleton et. al, 2001) and may explain why *Eurybia divaricata* has not colonized nearby woodlots which exhibit the same habitat characteristics. There is no other information available on the reproductive ecology of this species.

Interspecific Interactions

There is no information available on interspecific interactions for this species.

POPULATION SIZES AND TRENDS

Trends

Sharp et al. (1995) reported 8 populations in Canada, 3 in Ontario and 5 in Quebec in the previous status report. Seven of 22 known Ontario sites (32%) are presumed extirpated (NHIC 2002). Population numbers and population sizes (number of stems) within the populations in Ontario have increased since 1995. This could be due to favourable environmental factors and an intensified search effort.

In Quebec, there are currently 9 populations listed in the records of the Centre de données sur le patrimoine naturel (Gouvernement de Quebec, 2001). There is also one population listed in the 1995 status report that is not listed in the Centre's records. This makes a total of 10 possibly extant populations in Quebec. There has therefore been a 50% increase in the number of reported locations in Quebec, yet populations have not been monitored consistently and it appears that the number of viable populations is low and may be decreasing.

Numbers represent total number of stems found at the site, both vegetative and flowering. It is difficult to determine the number of clones represented in some of the populations without damaging the plants. The use of the term "sub-populations" indicates separate populations (or separate clones) found at the same location.

Note: Subsequent to the completion of the draft update report for this species, new information became available indicating that, in Ontario, a historic site has been rediscovered and additional new sites had been found. With this new information, the total number of records for the province was 22 with 15 of these extant. The new population data were provided to COSEWIC members at the time of discussions and assessment of this species in November 2002 and were incorporated into this finalized copy of the report.

Table 1. Ontario Population Summary for *Eurybia divaricata.*

	Year						
Location	1988	1991	1993	1995	1999	2000	2002
Crescent Estates Woodlot							100
Culp's Woods		1000's		?		400	400
Dufferin Island							20
Fonthill-Sandhill Valley ANSI			?			1000's	1000's
Marcy's Woods					200	200	200
Miller Creek Swamp Woodlot							100
Nelson Quarries					?	?	?
North Pelham Valley ANSI						0	30
Oakhill Forest - 1							10-20
Oakhill Forest - 2							6
Short Hills P.P. - Cataract Woods	>100			360	335	1300-1400	3800
Short Hills P.P. - Twelve Mile Creek ANSI	>100			?	350-400		1555
South Fort Erie							20-30
South Fort Erie 2							3
St. Johns C.A.						18	3
Summer Street Woodlot							20
Two Mile-Four Mile Creek ANSI - DND		63		100-150		165	?
Two Mile-Four Mile Creek ANSI - Niagara Shores				20	8	25	165

Summary of Extant Populations: Ontario

At one time, *Eurybia divaricata* was found at 16 sites in Ontario. The 1995 status report (Sharp et al., 1995) reported 3 sites for Ontario. 8 sites in Ontario were extant as of the year 2000. New fieldwork in 2002 has led to the discovery of 7 new sites, resulting in a total of 15 sites in Ontario.

Crescent Estates Woodlot

This site lies along a small creek and is bounded by successional meadow and residential development. The creek has been channelized in preparation for further urban development (Brady 1980). Vegetation consists of deciduous trees such as hawthorn, white elm, black oak, white ash, red oak, and shagbark hickory (Santarella 1986). Ken Ursic found 100 plants in this area in 2002. The areas in which *Eurybia divaricata* have been found have been described as pin oak deciduous swamp and red

maple mineral deciduous swamp. Intentional harvesting or coincidental shallow excavation was observed in 2002 (Ken Ursic, pers. comm.) This area is privately owned.

Culp's Woods

The Culp's Woods site is a remnant American beech-sugar maple-white ash woods. The moisture regime within the forest is mesic to dry-mesic and the soils are loamy clay (Sharp et al., 1995). In 1991, the population consisted of thousands of individuals. The population of *Eurybia divaricata* has declined since 1991, and consists of approximately 400 individuals. Parts of this woodlot have been cleared and used as a peach orchard since 1991, resulting in a decrease in the numbers of individual plants at this site.

Dufferin Island

Vegetation at Dufferin Island is mainly sugar maple, white ash and white elm, as well as willow and staghorn sumac. Helen Macdonald found 15-20 plants in 2002. Plants were located along a path at the base of an oak tree. This area is owned by the Niagara Parks Commission.

Fonthill-Sandhill Valley ANSI

At this site, areas where *Eurybia divaricata* has been found are noted as upland (ridge, slope and terrace) forests with a soil texture of sand to clay and a wet-mesic to dry moisture regime (Kaiser, 1986). *Eurybia divaricata* appears to be widespread throughout the ANSI, with higher numbers on the drier ridges. It is estimated that there are thousands of plants within the ANSI. It is likely that this is the largest and most stable population in Ontario, due to its widespread distribution and abundance.

Marcy's Woods (Point Abino Peninsula ANSI)

The upland forest communities of Marcy's Woods are dominated by sugar maple and red oak, occurring primarily on sand dune ridges (Oldham, 2000). The author counted approximately 200 plants in this area in 2001.

Miller Creek Swamp Woodlot

Ken Ursic found 100 plants at this location in 2002. *Eurybia divaricata* was found on an upland fresh-moist sugar maple-hardwood section in this deciduous swamp forest. This area is privately owned.

Nelson Quarries

An ecological inventory submitted by Dougan and Associates in 1999 indicated that *Eurybia divaricata* was discovered and collected within an area adjacent to a

property owned by Nelson Aggregates (Dougan and Associates, 1999). The area in which *Eurybia divaricata* was discovered is considered dry to fresh Sugar Maple-Oak upland deciduous forest. The author searched this site and could not locate any *Eurybia divaricata*. It may be that this site is extant, and further searching may lead to the rediscovery of this population. This population may be at risk from development, as it is surrounded by active quarries. In addition, there are several logging roads running through the property and it is unknown whether logging activities are continuing within this woodlot.

Short Hills Provincial Park

Sections of Short Hills Provincial Park that contain *Eurybia divaricata* are composed of upland sugar maple forest, with dry mesic to mesic silty clay soil (Sharp et al., 1995). In 2002, a thorough examination of the park has increased the number of stems found to approximately 5350.

Cataract Woods

Less than 100 plants were recorded from this area in 1988. In 1995 and 1999 surveys indicated that there were 300-400 plants in this area. In 2000, there were approximately 1300-1400 plants in total within this area. In 2002, this number had increased to 3800 stems.

Twelve-Mile Creek ANSI

Although the majority of the plants in the park appear to be healthy, in some areas the plants appear to be suffering. Although there were between 350 and 400 plants present in the Twelve Mile Creek area in 2000, the majority of the plants were <15 cm high and were not flowering. This could be due to an increase in the density of the canopy. *Eurybia divaricata* populations in some areas had been grazed, possibly by deer, which seem to be abundant in this part of the park. By 2002, the number of plants in this subpopulation had decreased to 25. The total number of plants in this area has increased due to increased search effort. Approximately 1555 plants are scattered in the area.

South Fort Erie

This area has been described as a fresh-moist oak-maple deciduous forest. Ken Ursic found 20 to 30 plants at this location in 2002. This woodlot is slated for a draft plan approved subdivision. The site is privately owned.

South Fort Erie 2

This population is located adjacent to a road. Ken Ursic found 3 plants at this location in 2002. This woodlot has been described as a dry fresh sugar maple oak deciduous forest. This area is privately owned.

St. Johns Conservation Area

St. Johns Conservation Area also supports a population of *Eurybia divaricata*. American beech (*Fagus grandifolia)* forms most of the canopy in this woodland, with white oak (*Quercus alba*), sugar maple (*Acer saccharum*) and Carolinian affiliates. In 2000, this population consisted of 18 individuals. The population was trampled, although many of the stems were in flower. A stem count of this population in 2002 found that the number of plants had been reduced to three very trampled stems. The Niagara Peninsula Conservation Authority is aware of the perilous situation of this population and has taken measures to ensure the protection of the plants at this site.

Summer Street Woodlot

This area has been described as fresh-moist sugar maple-hardwood deciduous forest. Ken Ursic found 20 plants at this location in 2002. The canopy vegetation is dominated by Black, Red, Silver and Sugar Maple, American Beech, Red, White, Pin and Swamp White Oak, Basswood, Red and White Ash, White Elm, Shagbark Hickory, and Black Cherry. The terrain is flat, moderately well drained, and not as wet as nearby areas. The area is bordered by cultivated fields and successional meadow (Brady 1980). This area is privately owned.

Two Mile - Four Mile Creek Area of Natural and Scientific Interest

Niagara Shores Conservation Area

The Niagara Shores Conservation Area population is located on a forested barrier beach dune between Lake Ontario and Four Mile Creek. Two sub-populations of *Eurybia divaricata* are located on a well-drained, wooded sand beach ridge consisting of silt loam to loam to fine sandy loam (Sharp et al., 1995). A total of 25 plants were found by the author in 2000. In 2002, this population had increased to 165 plants.

Department of National Defense

A population was also located on the Department of National Defense property. This consisted of 3 sub-populations totaling 165 plants, all within a 1 km^2 area. A second colony of plants reported from this area has not been located since 1991.

A more detailed account of the extent of *Eurybia divaricata* in Ontario can be found in the COSSARO status report (Thompson, 2000).

Summary of Extant Populations: Quebec

The 1995 status report for *Eurybia divaricata* reported 5 stations in Quebec. There are currently 9 locations listed in the database of the Quebec Centre de donnees sur le patrimoine naturel. Together, these two sources have listed a total of 10 sites for

Quebec. Since many of the sites have not been monitored or confirmed in several years, it is difficult to determine how many of these sites are still extant.

Table 2. Quebec Population Summary for *Eurybia divaricata*

	Year							
Location	**1980**	**1985**	**1987**	**1992**	**1994**	**1996**	**1997**	**1998**
Venise-en-Quebec	1000	2-3 colonies						
Philipsburg 1			1 colony					
Philipsburg 2			1 colony					
Mont St-Gregoire			15					
Colline Spruce				1 colony				
Mont Pinacle				18				
Mont Rougemont								1000
Saint-Armand						2 colonies		
Frelighsburg - Petit Pinacle					800			
Frelighsburg - Saint-Armand Centre							100	
St-Blaise							1 clone	

Venise-en-Quebec

This colony consisting of 2-3 colonies of *Eurybia divaricata* was located under a canopy of white pine (*Pinus strobus*), hickory (*Carya* spp.), red oak (*Quercus rubra*) and balsam fir (*Abies balsamifera*). Another colony located in the same area was found growing in the shade of eastern hemlock *(Tsuga canadensis*) with yellow birch (*Betula alleghaniensis*) (Sharp et al., 1995). This area is privately owned and has been developed as a golf course. A population of clones was recorded alongside the ditch close to the golf course. This population has not been confirmed since 1985 (Gouvernement du Quebec, 2001).

Philipsburg Migratory Bird Refuge

Two colonies of *Eurybia divaricata* were located at this station in 1987. One population was found growing on the side of a small hill underneath eastern hemlock. A second population was found growing in an understory of sugar maple (Sharp et. al., 1995). This population is not listed in the occurrences for the Quebec Centre de données sur le patrimoine naturel and the status of this population is unknown.

Mont St-Gregoire

This station is located in a large wood with an understory of American beech. One clone consisting of 15 stems was reported. American ginseng (*Panax quinquefolius*) and putty-root (*Aplectrum hyemale*) were found nearby. This property was under development pressure by the landowner when it was last seen in 1987. The landowner had been using the area as a landfill. It is unknown whether this population is still extant (Gouvernement du Quebec, 2001).

Colline Spruce

Eurybia divaricata was located in a rocky sugar maple-beech forest (about 50 years old) that has undergone partial cutting. Plants were located on a small hill, with hobblebush (*Viburnum lantanoides),* round-leaved violet *(Viola rotundifolia),* wild sarsaparilla *(Aralia nudicaulis),* alternate-leaved dogwood *(Cornus alternifolia),* mountain maple *(Acer spicatum),* silvery glade fern (*Deparia acrostichoides),* New York fern *(Thelypteris noveboracensis)* and panicled hawkweed *(Hieracium paniculatum)*. A single plant in flower was located (third week of September, 1992) in a search area of 150 by 300 m. It is not reported whether there were vegetative stems present at this site (Gouvernement du Quebec, 2001).

Mont Pinacle

Eurybia divaricata was found in a rocky sugar maple and ash dominated woodlot (about 50 years old) that has undergone partial cutting. Five or six individual plants in flower (4-7 flowers on each plant, first week of September in 1992) and a dozen vegetative rosettes, all of less than 40 cm in height, were located in an area of 20 by 50 m, principally on the third level of the escarpment (Gouvernement du Quebec, 2001).

Mont Rougement

Eurybia divaricata was recorded on a dry and rocky slope in a sugar maple-beech forest at this location. 2 colonies were found, adding up to approximately 1000 individuals. 50% of the individuals were in full flower the first week of September in 1998 (Gouvernement du Quebec, 2001).

Saint-Armand

The population of *Eurybia divaricata* located at this site was found with an understory of sugar maple and hemlock, with bulblet fern (*Cystopteris bulbifera)* and white snakeroot (*Eupatorium rugosum)*. Two isolated clones were found at this location, flowering the fourth week of August and the fourth week of September in 1996 (Gouvernement du Quebec, 2001). An estimate of the number of stems was not provided.

Frelighsburg

Petit Pinacle

Eurybia divaricata was located on the low end of the slope of a rocky hill bordering the bank of an intermittent stream. The forest in this area is dominated by sugar maple, yellow birch, hop hornbeam (*Ostrya virginiana)* and eastern hemlock. Approximately 800 plants in two sub-populations (700 and 100) were recorded, covering an area of about 30 metres square. Plants were observed in full flower and were beginning to fruit the third and fourth weeks of September in 1994 (Gouvernement du Quebec, 2001).

Saint-Armand Centre

Eurybia divaricata was located on two hills situated along a rocky talus, under cover of sugar maple, bitternut hickory (*Carya cordiformis)*, yellow birch and hop hornbeam associated with white snakeroot. Two colonies totaling more or less 100 stems in an area 25 meters/square were located in 1997 (Gouvernement du Quebec, 2001).

St. Blaise

At this site, *Eurybia divaricata* was located in a sugar maple forest with associates of bitternut hickory, black walnut (*Juglans cinerea)* and large-toothed aspen (*Populus grandidentata)*. Understory is dominated by zigzag goldenrod (*Solidago flexicaulis)*. A single clone in an area of about 3 metres square was found at the summit of a small hill. This population was last observed in September 1997 (Gouvernement du Quebec, 2001).

LIMITING FACTORS AND THREATS

No species-specific factors limit the distribution of *Eurybia divaricata*. Habitat destruction is the greatest threat to the species in both provinces.

The weevil *Barypeithes pellucidus*, which occurs in Ontario, preferentially consumes *Eurybia divaricata* in central Ohio (Galford 1987). Elsewhere in its range *Eurybia divaricata* is preferentially browsed by white-tailed deer in Pennsylvania and has been suggested as a potential indicator species for browsing intensity (Williams et al., 2000). Given the high deer populations in southern Ontario, this is certainly a potential threat.

Ontario

The populations at Niagara Shores Conservation Area are located perilously close to a well-used trail system and an actively eroding sand dune. One site at Short Hills Provincial Park is situated near high-use hiking trails. The populations at Four Mile Creek and at Short Hills may be threatened by the non-native garlic mustard (Alliaria petiolata) which is abundant throughout these two wooded areas. Some plants at Short Hills also appeared to have been grazed by deer. The Marcy's Woods, Short Hills and the St. John Conservation Area populations are impacted by trails running through the middle of the colonies. Culp's Woods may be in danger as well, as the remainder of the woodlot could be cleared for orchard expansion. South Fort Erie has been slated for development into a subdivision. Crescent Estates Woodlot population has been harvested or partially excavated.

Quebec

No site-specific threats are listed for any of the populations in Quebec, yet it is generally inferred in the site descriptions that habitat loss through development (golf course, landfill) and woodlot thinning are affecting the populations.

SPECIAL SIGNIFICANCE OF THE SPECIES

There is no information regarding any special economic or biological significance of this species. This species is one of the least common in the Asteraceae and is at the northern edge of its range in Ontario and Quebec.

EXISTING PROTECTION OR OTHER STATUS

Eurybia divaricata is currently designated as Threatened in Canada by the Committee on the Status of Endangered Wildlife in Canada (Sharp et al., 1995). This species has an S2 rank in Ontario, an S1 rank in Quebec, a National rank of N2 in Canada, and a Global rank of G5. This species does not have a COSSARO (Ontario Ministry of Natural Resources) status and is not legally protected in Ontario or Quebec.

This species is common throughout the rest of its range, although it does have an Srank of S2 in Maine and is listed as Threatened in that state (Table 3). This is consistent with its distribution in North America and rarity at the northern edges of its range.

Table 3. North American Conservation Status Ranks for *Eurybia divaricata* (NatureServe, 2000).

U.S. & Canada State/Province Conservation Status Ranks		
United States		**Canada**
Maine (S2)	Massachusetts (SR)	Ontario (S2)
Georgia (S5)	Michigan (SR)	Quebec (S1)
North Carolina (S5)	New Hampshire (SR)	
Ohio (SU)	New Jersey (SR)	
District of Columbia (S?)	New York (SR)	
Kentucky (S?)	Pennsylvania (SR)	
West Virginia (S?)	Rhode Island (SR)	
Alabama (SR)	South Carolina (SR)	
Connecticut (SR)	Tennessee (SR)	
Delaware (SR)	Vermont (SR)	
Maryland (SR)	Virginia (SR)	

Conservation Rank
S1: Critically Imperiled
S2: Imperiled
S5: Secure
SU: Unrankable
S?: Unranked
SR: Species Reported

SUMMARY OF STATUS REPORT

There are currently 15 extant populations of *Eurybia divaricata* in Ontario. Ten of 15 (66%) extant Ontario populations are small (< 100 plants) and/or at risk of destruction (Thompson 2000).

The population of *Eurybia divaricata* at Culp's Woods is located in an isolated woodlot surrounded by peach orchards. This population is not likely to spread to surrounding woodlots due to its isolated position. In addition, it appears that the population has diminished greatly since 1991. This could be due to impacts from the orchard operations, or clearing of the woodlot for expansion of the orchard.

The populations at Four Mile Creek-Niagara Shores are just barely 1 km apart. They could be considered part of the same population, although it should be noted that the sub-populations within the Niagara Shores Conservation Area are at high risk of extirpation due to their location along the main trail system. The populations located within the Department of National Defense property contain more plants and are probably more protected, as gaining access to this property is difficult.

The populations at Short Hills Provincial Park are large and scattered. The author noted that poor health, erosion, and grazing by deer could be affecting the population at Twelve Mile Creek ANSI. At the Cataract Woods site, the population seems quite healthy and very large, despite the trail system.

The population at Marcy's Woods appears stable, but is at risk due to the fact that a trail runs through its center, and that the land is privately owned and may be sold for development.

The population of *Eurybia divaricata* at the St. John's Conservation Area is quite small and is in very poor condition. The trail on which the species is located is a spur trail and may not be highly used, but many of the plants were trampled. It is not likely that this population will be able to survive without immediate protection.

It is likely that *Eurybia divaricata* is present at the Nelson Quarries site, although it is probably not found in large numbers. It is not known whether this area is slated for quarry expansion. The presence of a rare community type (black maple (*Acer nigrum*)-chinquapin oak (*Quercus muhlenbergii*) in the immediate vicinity may lead to protection of the site. In addition, the globally rare (G2) Virginia mallow (*Sida hermaphrodita*) occurs at the site. If more inventory work is attempted at this property, the chances of relocating *Eurybia divaricata* will be good.

Lastly, the Fonthill-Sandhill Valley ANSI must be considered the most viable and stable population in Ontario. *Eurybia divaricata* is widespread within the ANSI. Although there is no formal protection for this area, it is unlikely that *Eurybia divaricata* could become extirpated from this site without a great deal of disturbance. More work should be done to assess the full extent of *Eurybia divaricata* within the ANSI. In

addition, the private landowners should be informed of the presence of this species and protection afforded under the Ontario Provincial Policy Statement.

There are currently 10 reported populations of *Eurybia divaricata* in Quebec. Since many of the sites have not been monitored or confirmed in several years, it is difficult to determine how many of these sites are still extant. It is highly recommended that surveys be completed for all reported locations of *Eurybia divaricata* in Quebec in order to clarify the status of the species in that province.

There are only 25 reported locations of *Eurybia divaricata* in Canada, many of which have not been monitored for several years. Of the populations that have been recently confirmed, all but two are threatened to some degree, either by habitat destruction and development, trampling, small population size or environmental factors such as competition with invasive species and deer browsing or weevil consumption. Many of the sites in Ontario are located on public lands and do have some protection through management, but the majority of Quebec populations are on private lands where they are at risk.

TECHNICAL SUMMARY

Eurybia divaricata **(L.) Nesom**
White wood aster aster divariqué
Heart-leaved aster
Occurrence in Canada: Ontario and Quebec

Extent and Area information	
• *extent of occurrence (EO)(km²)*	<1500
• *specify trend (decline, stable, increasing, unknown)*	In Ontario, populations appear to be stable presently but have declined in the past. Infrequent data collection for populations in Quebec makes it hard to predict trends.
• *are there extreme fluctuations in EO (> 1 order of magnitude)?*	No
• *area of occupancy (AO) (km²)*	<50
• *specify trend (decline, stable, increasing, unknown)*	Stable
• *are there extreme fluctuations in AO (> 1 order magnitude)?*	No
• *number of extant locations*	25
• *specify trend in # locations (decline, stable, increasing, unknown)*	Increase in reported number of locations in Ontario. Increase in reported number of locations in Quebec.
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	No
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	Unknown
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	Unknown
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	8000-9000 individuals in scattered populations
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	Stable
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	No
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., <u>≤</u> 1 successful migrant / year)?*	Yes
• *list each population and the number of mature individuals in each*	See Tables 1 & 2
• *specify trend in number of populations (decline, stable, increasing, unknown)*	Increasing
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	No

Threats (actual or imminent threats to populations or habitats)	
- Habitat destruction	
- Invasive species	
- Browsing by deer	
- Weevil predation	
- Trampling	
• *does species exist elsewhere (in Canada or outside)?*	Yes
• *status of the outside population(s)?*	Stable
• *is immigration known or possible?*	Not known
• *would immigrants be adapted to survive here?*	Possibly
• *is there sufficient habitat for immigrants here?*	Possibly
Quantitative Analysis	

ACKNOWLEDGEMENTS

The author would like to thank T.W. Smith, M.J. Oldham, K. Ursic and J. Labreque for their contributions to this document. Funding provided by the Canadian Wildlife Service, Environment Canada.

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The author graduated in 1998 from McMaster University with an Honours degree in Geography and Environmental Studies. She has been working as a botanist through various positions in Southern Ontario, specializing in aquatic and woodland plant communities. In addition to an interest in botany, the author has obtained a Geographic Information Systems Specialist Certificate through Mohawk College and McMaster University. The author has prepared COSSARO status reports for Vulnerable, Threatened and Endangered species in Ontario, including White Wood Aster (*Eurybia divaricata*) and Virginia Mallow (*Sida hermaphrodita*). The author is also involved in the recovery of many species in Ontario and has prepared a RENEW recovery strategy for Hoary Mountain Mint (*Pycnanthemum incanum*) and White Wood Aster (*Eurybia divaricata*).

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COLLECTIONS EXAMINED

All Specimens at HAM were examined (and some were deposited).