

**Provisional Vascular Plant and Lichen Checklists of Red Banks Alvar,
Brown County, Wisconsin**
(State Natural Area No. 332)

Report to the Wisconsin Department of Natural Resources
Bureau of Endangered Resources

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Summary

Nine members of the Botanical Club of Wisconsin inventoried vegetation at the Red Banks Alvar State Natural Area in Brown County, Wisconsin on June 9, 2007 and May 17, 2008. Compiling information from voucher specimens and sight reports from several lists resulted in 200 vascular plant taxa and 68 lichen taxa. For vascular plants, 150 taxa were found in the east unit, and 107 in the west unit, and for lichens, 56 were found in the east unit and 20 in the west unit. These numbers are not considered complete because time did not allow a thorough exploration of all parts of both east and west units, and because ephemeral or later-blooming vascular plant taxa may have been missed. No rare vascular plants were observed, but three rare lichen species were discovered. We estimate that the checklists are approximately 87% complete for vascular plants and 75% complete for lichens.

Introduction

The Red Banks Alvar State Natural Area (SNA) covers 96 acres and consists of two units that lie on the east and west sides of State Hwy. 57 at a point ca. 9 miles northeast of the east edge of Green Bay and 8 miles southwest of the Brown-Door county line. The East Unit is 77 acres and the West Unit 19 acres. The geographic coordinates for the parking lot at the East Unit are N44° 36.25827' W87° 51.23124'.

The SNA is located in the Eastern Ridges and Lowlands geographical province (Martin 1932). Like the eastern shore of Lake Winnebago, Green Bay, and the Door Peninsula, the highway and the property lie along the relatively high and broad Niagara cuesta, one of the major topographic features of the province, and therefore trend northeast-southwest.

An alvar is a biological community based on a limestone pavement with thin or no soil and, as a result, dwarfed vegetation. The flat exposure of nearly barren limestone or dolomite

was scraped by glaciers and subsequently kept open by a variety of environmental factors. According to the Wikipedia web site, alvars can be found in southern Sweden, northwest Estonia, and around the Great Lakes in Michigan, New York, and Ohio in the United States and Ontario in Canada. To this list may be added Wisconsin, where they are extremely rare, Red Banks Alvar being the only good example. Some 120 alvars exist in the Great Lakes region (including Canada), but they comprise only 0.2% of the land area there. The use of the word "alvar" for this type of environment originated in Scandinavia, where it was applied to a similar landform near the Baltic Sea.

In 2007 the Botanical Club of Wisconsin (BCW) initiated a project to conduct botany blitzes of state natural areas that were in need of plant inventories. After several months of screening State Natural Areas with the WI Department of Natural Resources SNA program, Red Banks Alvar State Natural Area was selected for a botany blitz. Current plans include up to three trips to selected SNAs to inventory plants flowering at different times of the year. This report is therefore considered preliminary until the surveys are completed.

Unit descriptions

The entire property is wooded except under the power line right-of-way that traverses the length of the East Unit and the far southeast corner of that same unit. The East Unit is dry and well-drained, being developed on the extensive flat limestone bedrock, which is evident at the land surface in the form of pavement, scaly stones, and cliffs. The soil is reddish silty clayey loam and is very thin. Numerous small openings are more or less filled-in by encroaching brush of both native and introduced species. Specimens representing prairie, glade, and pine barrens species are sparse. The West Unit is developed on the west-facing escarpment of the Niagara upland overlooking Green Bay. It contains a mesic woods dominated by white cedar in all size classes. The two important associated tree species are white paper birch and American basswood. These and the other plants are normally found in dry-mesic, mesic-, and wet mesic, usually northern forests.

Methods

The checklists that follow, compiled by nine members of the Botanical Club of Wisconsin on June 9, 2007, are evidence of the level of floristic diversity present. Starting at 9:30 a.m., the nine members present divided into three teams and walked through the East Unit, recording their observations. The three morning teams consisted of Ted Cochrane, Barbara Cochrane, Dave White, Laurie Yahr, and Rich Kahl; Jim Bennett and Lynn White; and Tom Eddy and Neil Harriman. The Cochrane team did not make it to the power line or to the east or north boundary. Everyone reassembled at the cars right at noon, and after lunch, departed for the West Unit, driving north to Co. Hwy. A, then following it south to the parking spot at the trailhead to the Jean Nicolet statue. Participants were divided as to best way to access the natural area. Three, T. and B. Cochrane and Eddy, hiked more than a mile southward, passing the statue and entering the northeast corner of the West Unit. Bennett, Harriman and Yahr also spent a

short time inventorying the West unit, but the majority of the inventory work done on this unit was completed by T. & B. Cochrane and Eddy.

The SNA was visited a second time on May 17, 2008 by Jim Bennett, Ted and Barbara Cochrane, DNR land manager Joe Henry, Rich Kahl, Laurie Yahr, Carol Kropidlowski and Katherine Disterhaft. Collecting was done in both units from 9:30 a.m. to 2:30 p.m.

Many entries lack frequency estimations (A-abundant, C-common, O-occasional, R-rare, based on the WI DNR Plant Species List Legend) because we did not pay enough attention to these species to make such judgments. Specimen citations include the collectors' last names, collection number, and herbarium of deposition. The following abbreviations apply to collectors: B – Bennett, BCW – Botanical Club of Wisconsin, C – Cochrane, E – Eddy, H – Harriman, W – White; these abbreviations are used for herbaria: OSH = University of Wisconsin-Oshkosh, WIS = University of Wisconsin-Madison.

Nomenclature for the vascular plants is based on Wetter et al., 2001. Nomenclature for the lichens is based on Esslinger, 2007. Although voucher specimens of some species were collected (Cochrane's set is in WIS, the Eddy and Harriman sets are in OSH), most vascular plant listings are sight reports. The separate vascular plant lists from the two teams for 2007 are included in appendices, and a merged list is provided in the report. Vascular plant vouchers for 2008 from Ted Cochrane are listed below.

East Unit: *Eleocharis compressa*-Cochrane et al. 14766 (locally common); *Carex crawei*-Cochrane et al. 14766 (abundant); *Cardamine parviflora*-Cochrane et al. 14767 (locally frequent); *Houstonia longifolia*-Cochrane et al. 14769 (abundant); *Packera paupercula*-Cochrane et al. 14770 (abundant); *Viola nephrophylla*-Cochrane et al. 14771 (occasional); *Carex tetanica*-Cochrane et al. 14772 (occasional)

West Unit (across road): *Corydalis aurea*-Cochrane et al. 14773 (very local, 4 plants seen); *Viola conspersa*-Cochrane et al. 14774 (very local, 2 plants seen); *Deparia acrostichoides*-Cochrane et al. 14775

Results

Vascular Plants

Species	East unit	West unit	Botanist
<i>Acer negundo</i> – R (sapling)		x	Cochrane
<i>Acer spicatum</i>		x	TLE & NAH
<i>Achillea millefolium</i>	x		TLE & NAH
<i>Actaea rubra</i> – O		x	Cochrane, TLE & NAH
<i>Adiantum pedatum</i> – R		x	Cochrane
<i>Agrimonia sp.</i> – R		x	Cochrane
<i>Amphicarpaea bracteata</i> – R		x	Cochrane
<i>Anemone quinquefolia</i> – A	x		Cochrane
<i>Anemone virginiana</i> – O	x	x	Cochrane
<i>Antennaria neglecta</i>	x		Cochrane
<i>Apocynum androsaemifolium</i> – R	x	x	Cochrane
<i>Aquilegia canadensis</i> – O		x	Cochrane, TLE & NAH
<i>Arabis divaricarpa</i> – R	x	x	Cochrane
<i>Arabis glabra</i>	x		TLE & NAH
<i>Arabis sp.</i>		x	Cochrane
<i>Aralia nudicaulis</i> – A	x	x	Cochrane, TLE & NAH
<i>Arctium minus</i>		x	TLE & NAH
<i>Arctostaphylos uva-ursi</i> – R	x		Cochrane
<i>Arisaema triphyllum</i> – A		x	Cochrane, TLE & NAH
<i>Asarum canadense</i> – C		x	Cochrane, TLE & NAH
<i>Asplenium rhizophyllum</i> – R		x	Cochrane, TLE & NAH
<i>Athyrium filix-femina</i> – O	x	x	Cochrane
<i>Barbarea vulgaris</i>	x		TLE & NAH
<i>Berberis thunbergii</i>	x		TLE & NAH
<i>Betula papyrifera</i> – O	x	x	Cochrane, TLE & NAH
<i>Botrychium dissectum</i> – R	x		Cochrane
<i>Calamagrostis canadensis</i>	x		Cochrane
<i>Campanula rotundifolia</i> – C	x		Cochrane, TLE & NAH
<i>Cardamine parviflora</i> var. <i>arenicola</i> – C	x		Cochrane
<i>Carex alopecoidea</i>	x		TLE & NAH
<i>Carex blanda</i> – O	x	x	Cochrane
<i>Carex cephalophora</i> – R	x		Cochrane
<i>Carex crawei</i> – A	x		Cochrane
<i>Carex cristatella</i> – R		x	Cochrane
<i>Carex deweyana</i> – O	x	x	Cochrane, TLE & NAH

Species	East unit	West unit	Botanist
<i>Carex eburnea</i> – O	x	x	Cochrane, TLE & NAH
<i>Carex granularis</i>	x		TLE & NAH
<i>Carex grisea</i> – R	x		Cochrane
<i>Carex peckii</i> –	x	x	Cochrane
<i>Carex pennsylvanica</i> – A	x	x	Cochrane, TLE & NAH
<i>Carex radiata</i>	x	x	Cochrane
<i>Carex rosea</i> – O	x		Cochrane
<i>Carex sparganioides</i> – R	x	x	Cochrane
<i>Carex tetanica</i>	x		TLE & NAH
<i>Carex umbellata</i>	x		Cochrane
<i>Carya ovata</i>	x		Cochrane, TLE & NAH
<i>Caulophyllum thalictroides</i>		x	TLE & NAH
<i>Ceanothus herbaceus</i> – R	x		Cochrane
<i>Cerastium fontanum</i> – O	x	x	Cochrane
<i>Chenopodium simplex</i> – R		x	Cochrane
<i>Circaea</i> sp.	x	x	Cochrane, TLE & NAH
<i>Cirsium vulgare</i> – R	x	x	Cochrane
<i>Comandra umbellata</i> – A	x		Cochrane
<i>Cornus alternifolia</i> – R		x	Cochrane
<i>Cornus racemosa</i> – A	x	x	Cochrane, TLE & NAH
<i>Cornus rugosa</i>	x	x	Cochrane
<i>Corydalis aurea</i> – R		x	Cochrane
<i>Cynoglossum officinale</i> – R	x		Cochrane
<i>Cypripedium</i> sp. – R	x		Cochrane
<i>Cystopteris bulbifera</i> – A		x	Cochrane, TLE & NAH
<i>Cystopteris tenuis</i> – O	x	x	Cochrane
<i>Danthonia spicata</i>	x		Cochrane
<i>Deparia acrostichoides</i>		x	Cochrane
<i>Dicentra canadensis</i> – R	x		Cochrane
<i>Dichanthelium</i> sp.	x		Cochrane
<i>Diervilla lonicera</i> – A		x	Cochrane, TLE & NAH
<i>Dioscorea villosa</i> – R		x	Cochrane
<i>Dodecatheon meadii</i> - C	x		TLE & NAH
<i>Dryopteris carthusiana</i> – R	x	x	Cochrane
<i>Eleocharis compressa</i> var. <i>compressa</i> – C	x		Cochrane
<i>Epipactis helleborine</i> – R	x		Cochrane
<i>Erigeron philadelphicus</i> – O	x	x	Cochrane
<i>Erigeron pulchellus</i> – C	x		Cochrane, TLE & NAH

Species	East unit	West unit	Botanist
<i>Erigeron strigosus</i>	x		TLE & NAH
<i>Eurybia macrophylla</i>	x		Cochrane
<i>Festuca subverticillata</i> – R		x	Cochrane
<i>Fragaria virginiana</i> – C	x	x	Cochrane, TLE & NAH
<i>Fraxinus americana</i> – R	x	x	Cochrane, TLE & NAH
<i>Fraxinus pennsylvanica</i>	x	x	Cochrane
<i>Galium aparine</i> – R	x	x	Cochrane, TLE & NAH
<i>Galium boreale</i> – C	x	x	Cochrane, TLE & NAH
<i>Galium triflorum</i> – O		x	Cochrane, TLE & NAH
<i>Geranium maculatum</i> – O	x	x	Cochrane, TLE & NAH
<i>Geum canadense</i> – O		x	Cochrane
<i>Glyceria striata</i>		x	Cochrane
<i>Gymnocarpium dryopteris</i> – R		x	Cochrane
<i>Hackelia deflexa</i> – O	x	x	Cochrane
<i>Helianthus hirsutus</i>	x		Cochrane
<i>Helianthus strumosus</i>	x		Cochrane
<i>Hepatica americana</i> – R		x	Cochrane, TLE & NAH
<i>Hesperis matronalis</i> – R	x	x	Cochrane, TLE & NAH
<i>Heuchera richardsonii</i> – R	x		Cochrane
<i>Hieracium aurantiacum</i> – O	x		Cochrane, TLE & NAH
<i>Hieracium caespitosum</i>	x		TLE & NAH
<i>Hieracium piloselloides</i> – O	x		Cochrane
<i>Houstonia (Hedyotis) longifolia</i> – A	x		TLE & NAH
<i>Hypericum perforatum</i> – O	x		Cochrane
<i>Hypoxis hirsuta</i> – R	x		Cochrane, TLE & NAH
<i>Impatiens capensis</i>	x	x	Cochrane
<i>Juniperus virginiana</i> – A	x		TLE & NAH
<i>Juniperus communis</i> – A	x		Cochrane, TLE & NAH
<i>Leonurus cardiaca</i> – O	x	x	Cochrane, TLE & NAH
<i>Leucanthemum vulgare</i> – R	x		Cochrane
<i>Lithospermum officinale</i>	x	x	TLE & NAH
<i>Lobelia kalmia</i>	x		Cochrane
<i>Lobelia spicata</i> – R	x		Cochrane
<i>Lonicera dioica</i> – R	x		Cochrane
<i>Lonicera hirsuta</i> – R	x		Cochrane
<i>Lonicera tatarica</i>	x		TLE & NAH
<i>Lonicera X bella</i> – R	x	x	Cochrane
<i>Luzula multiflora</i>	x		Cochrane, TLE & NAH

Species	East unit	West unit	Botanist
<i>Lycopus americanus</i>		x	Cochrane
<i>Maianthemum canadense</i> – A	x	x	Cochrane, TLE & NAH
<i>Monarda fistulosa</i> – R		x	Cochrane
<i>Nepeta cataria</i>	x		TLE & NAH
<i>Osmorhiza claytonii</i> – O		x	Cochrane, TLE & NAH
<i>Oxalis stricta</i> (<i>O. europaea</i>) – R		x	Cochrane, TLE & NAH
<i>Packera paupercula</i> – A	x		Cochrane
<i>Parietaria pensylvanica</i> – A		x	Cochrane
<i>Parthenocissus quinquefolia</i>	x	x	Cochrane
<i>Parthenocissus vitacea</i>		x	TLE & NAH
<i>Pedicularis canadensis</i> – O	x		Cochrane, TLE & NAH
<i>Phryma leptostachya</i> – R	x	x	Cochrane
<i>Physocarpus opulifolius</i>	x		Cochrane, TLE & NAH
<i>Pilea</i> sp. – O	x	x	Cochrane
<i>Poa compressa</i> – A	x		Cochrane
<i>Poa pratensis</i>	x		Cochrane
<i>Podophyllum peltatum</i> – R	x	x	Cochrane, TLE & NAH
<i>Polygala senega</i> - O	x		Cochrane, TLE & NAH
<i>Polygonatum biflorum</i>	x		Cochrane
<i>Polygonatum pubescens</i> – C		x	Cochrane
<i>Polygonum virginianum</i>	x	x	Cochrane
<i>Populus tremuloides</i> – O	x		Cochrane
<i>Potentilla recta</i> – O	x		TLE & NAH
<i>Potentilla simplex</i> – O	x		Cochrane, TLE & NAH
<i>Prenanthes alba</i> – O	x		Cochrane
<i>Prunella vulgaris</i> – O	x		Cochrane, TLE & NAH
<i>Prunus serotina</i>	x		Cochrane
<i>Prunus virginiana</i> – A	x	x	Cochrane
<i>Pycnanthemum virginianum</i>	x		Cochrane
<i>Quercus alba</i> – C	x		Cochrane, TLE & NAH
<i>Quercus ellipsoidalis</i>	x		Cochrane
<i>Quercus macrocarpa</i>	x	x	Cochrane, TLE & NAH
<i>Quercus rubra</i>	x		TLE & NAH
<i>Ranunculus abortivus</i>	x	x	Cochrane
<i>Ranunculus fascicularis</i> – O	x	x	TLE & NAH
<i>Rhamnus cathartica</i> – C	x	x	Cochrane, TLE & NAH
<i>Ribes cynosbati</i> – R (East), C (West)	x	x	Cochrane, TLE & NAH
<i>Rosa blanda</i> – O	x		TLE & NAH

Species	East unit	West unit	Botanist
<i>Rosa carolina</i> – O	x		Cochrane
<i>Rubus idaeus</i> – C		x	Cochrane, TLE & NAH
<i>Rubus occidentalis</i> – R		x	Cochrane
<i>Rudbeckia hirta</i> (?)	x		Cochrane
<i>Sambucus pubens</i> – C		x	Cochrane, TLE & NAH
<i>Sanguinaria canadensis</i> – O		x	Cochrane, TLE & NAH
<i>Sanicula</i> cf. <i>gregaria</i> – R	x	x	Cochrane, TLE & NAH
<i>Schizachyrium scoparium</i>	x		Cochrane
<i>Senecio pauperculus</i>	x		TLE & NAH
<i>Shepherdia canadensis</i> – A	x		Cochrane, TLE & NAH
<i>Smilacina racemosa</i> – C		x	Cochrane, TLE & NAH
<i>Smilacina stellata</i> – A	x	x	Cochrane
<i>Smilax ecirrhata</i> – R		x	Cochrane, TLE & NAH
<i>Solanum dulcamara</i>	x	x	Cochrane, TLE & NAH
<i>Solidago</i> cf. <i>flexicaulis</i>		x	Cochrane
<i>Solidago gigantea</i>	x		Cochrane
<i>Spiraea alba</i>	x		Cochrane
<i>Symphiotrichum lateriflorum</i>	x	x	Cochrane
<i>Symphiotrichum</i> sp.	x		Cochrane
<i>Symphoricarpos albus</i> – R	x	x	Cochrane, TLE & NAH
<i>Symphyotrichum ericoides</i>	x		Cochrane
<i>Symphyotrichum novae-angliae</i>	x		Cochrane
<i>Symphyotrichum oolentangiense</i>	x		Cochrane
<i>Taenidia integerrima</i> – R	x		Cochrane, TLE & NAH
<i>Taraxacum officinale</i> – R	x		Cochrane
<i>Thalictrum dioicum</i> – O	x	x	Cochrane, TLE & NAH
<i>Thuja occidentalis</i> – A	x	x	Cochrane, TLE & NAH
<i>Tilia americana</i> – C		x	Cochrane, TLE & NAH
<i>Toxicodendron rydbergii</i> – O	x	x	Cochrane
<i>Tragopogon dubius</i>	x		TLE & NAH
<i>Trillium grandiflorum</i>	x	x	Cochrane
<i>Trillium grandiflorum</i>		x	Cochrane
<i>Triosteum perfoliatum</i>		x	TLE & NAH
<i>Triosteum</i> sp. – R	x		Cochrane
<i>Ulmus americana</i> – O		x	TLE & NAH
<i>Urtica dioica</i>		x	Cochrane, TLE & NAH
<i>Uvularia sessilifolia</i> – R	x	x	Cochrane
<i>Vaccinium angustifolium</i> – R	x		Cochrane

Species	East unit	West unit	Botanist
<i>Verbascum thapsus</i>	x		Cochrane
<i>Veronica officinalis</i> – R	x		Cochrane, TLE & NAH
<i>Veronica peregrina</i> var. <i>xalapensis</i>	x		TLE & NAH
<i>Veronicastrum virginicum</i> – O	x		Cochrane
<i>Viburnum lentago</i> – R	x	x	Cochrane
<i>Viburnum rafinesquianum</i>	x		Cochrane, TLE & NAH
<i>Vicia sativa</i>	x		TLE & NAH
<i>Viola labradorica</i> – R		x	Cochrane
<i>Viola nephrophylla</i> – O		x	Cochrane
<i>Viola pubescens</i>	x	x	Cochrane
<i>Viola sororia</i>		x	Cochrane, TLE & NAH
<i>Vitis riparia</i>		x	Cochrane, TLE & NAH
<i>Zizia aurea</i>	x		TLE & NAH
Total	150	107	

Vascular plant discussion

In the East Unit trees and shrubs are abundant, but those of some deciduous species like bur oak and shagbark hickory are stunted. The dominant tree is red cedar (*Juniperus virginiana*), followed by trembling aspen (*Populus tremuloides*) and bur oak (*Quercus macrocarpa*). Other trees include black cherry (*Prunus serotina*), white oak (*Q. alba*), Hill's oak (*Q. ellipsoidalis*), basswood (*Tilia americana*), and white birch (*Betula papyrifera*). There is an unusually high content of shrubs: gray dogwood (*Cornus racemosa*), common juniper (*Juniperus communis*), chokecherry (*Prunus virginiana*), buffalo-berry (*Shepherdia canadensis*), snowberry (*Symphoricarpos albus*), and arrow-wood (*Viburnum rafinesquianum*) are all abundant; round-leaved dogwood (*C. rugosa*) and common buckthorn (*Rhamnus cathartica*) are common; and ninebark (*Physocarpus opulifolius*) and Rydberg's poison-ivy (*Toxicodendron rydbergii*) are occasional. Two vines and one low trailing shrub of rare occurrence are bearberry (*Arctostaphylos uva-ursi*), wild honeysuckle (*Lonicera dioica*), and hairy honeysuckle (*L. hirsuta*). The herbaceous ground layer is moderate in floristic richness, but the plants are sparsely or patchily distributed. The prevalent species comprise a mixture of herbs of the dry-mesic forests, both southern, e.g., Pennsylvania sedge (*Carex pensylvanica*) and northern, e.g., wood anemone (*Anemone quinquefolia*) and Canada mayflower (*Maianthemum canadense*); oak barrens, e.g., bastard-toadflax (*Comandra umbellata*); dry prairies, e.g., harebell (*Campanula rotundifolia*), prairie alumroot (*Heuchera richardsonii*), and wood-betony (*Pedicularis canadensis*); and calciphiles that also occur in fens, e.g., northern bedstraw (*Galium boreale*) and Seneca snakeroot (*Polygala senega*). No rare plants were noted.

The West Unit is more mesic. White-cedar (*Thuja occidentalis*) is dominant over the whole face of the escarpment, and white birch (*Betula papyrifera*) and basswood (*Tilia americana*) are much more common than they are in the East Unit. There are fewer species of shrubs and woody vines than are found in the East Unit, and they are low in density by

comparison. The most common shrubs are gray dogwood (*Cornus racemosa*), chokecherry (*Prunus virginiana*), red raspberry (*Rubus idaeus* ssp. *strigosus*), and red elderberry (*Sambucus racemosa* ssp. *pubens*). The fern frequency is much higher than that found in the East Unit; bladder fern (*Cystopteris bulbifera*) is very abundant, but the majority of the seven species listed are occasional or rare. The extremely distinct walking fern (*Asplenium rhizophyllum*), which reproduces via stolon-like leaf tips, forms patches on a few large dolomite boulders. One group of plants usually particularly noticeable in northern mesic forests is the spring ephemerals. Several, including jack-in-the-pulpit (*Arisaema triphyllum*), wild ginger (*Asarum canadense*), round-lobed hepatica (*Hepatica americana*), and bloodroot (*Sanguinaria canadensis*) occur here, but there does not seem to be a large representation of these interesting plants, perhaps due to season of sampling. No saprophytic or parasitic plants were found although such are characteristically found in this habitat. Neither was any rare plants noted.

Small remnants of savannas, probably with old-growth characteristics, dominated by *Quercus alba* and *Q. macrocarpa*, are patchily distributed in the western part of the East Unit. Although these are of great conservation and research interest, a comprehensive inventory of these areas is still lacking (we passed through one such stand when returning to the cars on one of the trips but did not collect any information). They may face serious management threats, most due to the absence of fire in historic times and susceptibility to invasion by non-native (common buckthorn, honeysuckles) and native (red-cedar) woody species.

The botanically diverse East Unit also includes some interesting, seasonally moist, prairie-like openings in the southeast corner and also west of the power line in the center of the unit. These are surprisingly wet in spring but become severely dry by midsummer. Those east of the powerline right-of-way contain some small, very shallow, moist depressions with bottoms of exposed bedrock lined with crusts of mosses. These openings might well merit the description “pristine” or approximate presettlement conditions. Unfortunately, the timing of our visit was too early in the season. Most of the herbaceous cover was very low, not having had enough time to grow; few species were in bloom, and it was difficult to identify individual plants. Therefore, species composition and species richness, and the degree to which these matched openings differ from each other, remain incompletely known. The plant species may vary considerably from place to place, the major dominants changing from Canada bluegrass (*Poa compressa*)-Crawe’s sedge (*Carex crawei*)-long-leaved bluets (*Houstonia longifolia*)-northern ragwort (*Packera paupercula*) to little bluestem (*Schizachyrium scoparium*)-poverty oat grass *Danthonia spicata* in localized areas within the same opening. This community is a specialized type, closely linked with prairies because it shares many species with those more widespread but somewhat distant communities.

A stand of deciduous swamp dominated by black ash (*Fraxinus nigra*) in the northern portion of the unit was not investigated.

The difference in the number of species between the two units can be explained in part by their relative size and in part by the differences in vegetation at each site. Not only is the east unit is four times larger, but also it is more ecologically diverse. The environment, including air temperature and humidity over the day-night cycle and development of the substrate that functions as soil, is more uniform in the west unit, which supports a more stable, limited plant

community. The east unit contains several community types, both canopied and uncanopied, and offers more open habitat not available in the west unit.

Of the six species mentioned by the WI DNR as rare for the natural area, *Diplazium pycnocarpon*, *Gentiana alba*, *Carex richardsonii*, *Euonymus atropurpurea*, and *Staphylea trifolia* were not observed, but parts of each unit were not explored, and the rare species may have been missed. *Carex crawei* was found to be very abundant in the east unit.

We estimate that there are possibly as many as 30 more species in the SNA, which were probably missed by not surveying pockets of habitat (e.g. the black ash swamp, oak savannas), by not surveying the fall flora, and omitting weed and exotic species along the margins. This means that the above checklist is approximately 87% complete. There are no unidentified specimens remaining.

Lichens

Species	Substrate	Unit	Relative frequency	Record
<i>Amandinea dakotensis</i>	oak bark	W	R	county
<i>Amandinea polyspora</i>	downed branch	W	O	county
<i>Amandinea punctata</i>	bark & old juniper wood	E	C	county
<i>Arthonia caesia</i>	bark & downed branch	EW	A	county
<i>Arthonia fuliginosa</i>	bark	E	R	county
<i>Arthonia radiata</i>	bark	EW	C	county
<i>Biatora vernalis</i>	moss	E	R	county
<i>Caloplaca flavorubescens</i>	bark	E	O	county
<i>Caloplaca holocarpa</i>	bark	E	O	county
<i>Caloplaca subsoluta</i>	limestone	E	C	county
<i>Candelaria concolor</i>	bark	E	C	county
<i>Candelariella efflorescens</i>	bark	E	A	county
<i>Catillaria nigroclavata</i>	bark	E	R	state
<i>Cladonia coniocraea</i>	moss	E	O	county
<i>Cladonia cristatella</i>	old wood	E	O	county
<i>Cladonia cylindrica</i>	old wood	E	R	county
<i>Cladonia fimbriata</i>	moss	E	O	county
<i>Cladonia rei</i>	old wood	E	R	county
<i>Cladonia symphy carpia</i>	moss& soil	E	O	county
<i>Dermatocarpon miniatum</i>	limestone	EW	O	county
<i>Dermatocarpon multifolium</i>	limestone	E	R	state
<i>Evernia mesomorpha</i>	bark	W	R	county
<i>Flavoparmelia caperata</i>	bark	E	A	county
<i>Graphis scripta</i>	dead maple	EW	O	county
<i>Hypocenomyce scalaris</i>	old wood	E	R	county
<i>Hypogymnia physodes</i>	downed branch	W	R	county
<i>Imshaugia placarodia</i>	bark	E	R	county
<i>Julella sericea</i>	bark	E	R	county
<i>Lecanora dispersa</i>	limestone	E	O	county
<i>Lecanora hybocarpa</i>	oak bark	EW	O	county
<i>Lecanora saligna</i>	old juniper wood	E	R	county
<i>Lecanora symmicta</i>	bark	E	C	county
<i>Lecanora thysanophora</i>	bark	E	O	county
<i>Lepraria lobificans</i>	bark	E	O	county
<i>Leptogium cyanescens</i>	limestone	W	O	county
<i>Melanelia fuliginosa</i>	bark	E	O	state
<i>Melanelia subaurifera</i>	downed branch	W	O	county
<i>Mycobilimbia tetramera</i>	moss	W	R	county

Species	Substrate	Unit	Relative frequency	Record
<i>Mycocalicium subtile</i>	old wood	E	R	county
<i>Opegrapha varia</i>	hickory bark	E	O	county
<i>Parmelia sulcata</i>	bark	E	A	county
<i>Parmeliopsis hyperopta</i>	bark	E	C	county
<i>Peltigera rufescens</i>	moss	EW	O	county
<i>Pertusaria macounii</i>	oak bark	W	R	county
<i>Phaeophyscia adiastrata</i>	moss	W	O	county
<i>Phaeophyscia rubropulchra</i>	birch bark	W	O	county
<i>Physcia adscendens</i>	rock	E	R	none
<i>Physcia aipolia</i>	bark & downed branch	EW	A	none
<i>Physcia millegrana</i>	bark & downed branch	EW	A	none
<i>Physconia leucoleiptes</i>	bark	E	O	county
<i>Placynthiella icmalea</i>	old juniper wood	E	R	county
<i>Placynthium nigrum</i>	limestone	E	C	county
<i>Protoblastenia rupestris</i>	limestone	E	O	county
<i>Pseudevernia consocians</i>	bark	E	R	county
<i>Punctelia rudecta</i>	bark	E	O	county
<i>Ramalina americana</i>	bark	E	R	county
<i>Rhizocarpon grande</i>	granite	E	R	county
<i>Rhizoplaca subdiscrepans</i>	rock	E	R	county
<i>Rinodina pyrina</i>	bark	E	R	county
<i>Sarcogyne regularis</i>	limestone	E	O	county
<i>Scoliciosporum chlorococcum</i>	birch bark	W	C	county
<i>Stereocaulon saxatile</i>	rock	E	R	county
<i>Usnea lapponica</i>	bark	W	R	county
<i>Verrucaria calkinsiana</i>	limestone	E	C	county
<i>Verrucaria glaucovirens</i>	limestone	E	O	county
<i>Verrucaria nigrescens</i>	limestone	E	C	county
<i>Xanthoparmelia somloensis</i>	granite	E	O	county
<i>Xanthoria fulva</i>	bark	E	O	county

Lichen discussion

All but three of the species are either county or Wisconsin records, Brown County being extremely under collected. There are at least two, possibly three state records. *Catillaria nigroclavata* is definitely new to the state list, but has probably been overlooked previously. *Dermatocarpon multifolium* is a new segregate from *Dermatocarpon miniatum* that hasn't been

published yet. *Melanelia fuliginosa* (two collections in the East Unit) was recently reported as being present in Wisconsin based on Thomson's *American Arctic Lichens* (1984), but no specimen was found in several herbaria (Bennett 2006). These collections represent the only vouchered ones for this species in the state. The *Pseudevernia consocians* specimen is highly unusual and very atypical and may be a new species. There are other species present that were infrequent, but are found elsewhere in the state. The remaining species are common and frequent both at the SNA and elsewhere in the state.

The total number of species found in the SNA was 68. A natural area this size in this part of the state I would estimate should have somewhere between 90-100 species, leading me to conclude that the above list is about 75% complete. The total number of species found in the East Unit was 56, while 20 were found in the West Unit. This difference is probably due to several factors, including size of each unit, habitat and substrate diversity, and collecting intensity.

Substrate diversity in the SNA is high, and includes limestone, granite, other rocks, all species of trees, old junipers, moss and soil.

Most of the species listed above are vouchered, and collection numbers will be provided upon request. The specimens will be deposited in the private herbarium of J. P. Bennett. Some of the very common, weedy species were not vouchered, and were noted present in a field notebook. About half a dozen specimens, possibly in the genera *Acarospora* and *Verrucaria*, remain unidentified and will be worked on as time permits.

Recommendations

Both units are definitely worthy of preservation owing to the uniqueness of the habitats they support and the special snails they contain. It would be desirable to extend the project area on the west side of the highway northward by about 1000 feet to within 100 yards of the Nicolet statue as the habitat there is continuous. The East Unit is suffering from severe in-filling by brush and increasing tree density. The BCW recommends the WI DNR invest in continued buckthorn/honeysuckle removal and treatment, selective thinning of tree density and use of prescribed burns to restore the alvar community. The BCW is willing to partner with the WDNR in this endeavor.

Data for the three lichen state records will be assembled for entry into the WI DNR endangered species list. These species depend on their vascular plant hosts for survival. Therefore areas to be burned or have removal treatments should be examined for the rare lichen species in advance.

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Appendix 1. Vascular plants identified by the Cochrane teams

Plant Species List for 9 June 2007

(East Unit: T. Cochrane, B. Cochrane, D. White, L. Yahr, and R. Kahl

West Unit: T. and B. Cochrane)

East Unit list

TREES

Carya ovata
Fraxinus pennsylvanica
Juniperus virginiana – dominant in large areas
Populus tremuloides – subdominant
Prunus serotina
Quercus alba
Q. ellipsoidalis
Q. macrocarpa – subdominant
Tilia americana
Betula papyrifera

SHRUBS

Arctostaphylos uva-ursi – R
Cornus racemosa
C. rugosa
Juniperus communis – A
Lonicera X bella – R
L. dioica – R (C & BCW 14653, WIS)
L. hirsuta – R (C & BCW 14648, WIS)
Physocarpus opulifolius – O
Prunus virginiana – A
Rhamnus cathartica – C
Ribes cynosbati – R
Rosa sp. – O
Shepherdia canadensis – A
Symphoricarpos albus – A (C & BCW 14657, WIS)
Toxicodendron rydbergii – O
Viburnum rafinesquianum – A (C & BCW 14656, WIS)

FERNS

Botrychium dissectum – R (1 plant)

HERBS

Anemone virginiana – O
A. quinquefolia – A

Antennaria neglecta (C & BCW 14650, WIS)
Apocynum androsaemifolium – R
Arabis divaricarpa (C & BCW 14649, WIS)
Campanula rotundifolia – C
Carex cephalophora – R (C & BCW 14652, WIS)
C. grisea – R (C & BCW 14655, WIS)
C. pensylvanica – A
C. rosea – O
Ceanothus herbaceus – R (3 very small plants, close together)
Cerastium fontanum – O
Circaea sp [C. lutetiana?]
Comandra umbellata – A
Cynoglossum officinale – R (1 plant)
Cypripedium sp. – R (2 small plants)
Dicentra canadensis – very rare? (only 1 leaf seen, but ephemerals in this very dry habitat may simply have disappeared by now)
Epipactis helleborine – R (2 plants, both pulled)
Erigeron pulchellus – C
Fragaria virginiana – C
Galium aparine – O
G. boreale – C
Geum canadense – O
Geranium maculatum – O
Helianthus hirsutus
H. strumosus
Heuchera richardsonii – R (1 plant)
Hieracium aurantiacum – one patch
Hieracium piloselloides – occasional patches in openings (C & BCW 14651)
Hypericum perforatum – O
Hypoxis hirsuta – very rare? (1 plant in flower; others may be present)
Leucanthemum vulgare – R (two very small areas; plants were pulled)
Lobelia spicata – R (2 plants)
Luzula multiflora – R
Maianthemum canadense – A
Nepeta cataria
Monarda fistulosa
Pedicularis canadensis – O
Poa compressa – A
P. pratensis
Polygala senega – A
Potentilla simplex – 2 patches, one big
Prenanthes alba – O
Prunella vulgaris – O
Smilacina racemosa – C
S. stellata – A
Smilax ecirrhata – O

Symphiotrichum sp. (basal and lower lvs w/ petioles, cordate bases)
Taenidia integerrima – R (two very small areas, mostly seedlings) (*C & BCW 14654*, WIS)
Taraxacum officinale – R
Triosteum – R (1 plant)
Vaccinium angustifolium – R (1 plant)
Verbascum ?
Veronica officinale – two patches
Viola sp.

West Unit list

TREES

Betula papyrifera – O (large specimens)
Fraxinus americana – R (1 small sapling)
Fraxinus pennsylvanica
Quercus macrocarpa
Thuja occidentalis – A (dominant over the whole area)
Tilia americana

SHRUBS AND WOODY VINES

Cornus racemosa – A
C. rugosa
Diervilla lonicera – A
Parthenocissus quinquefolia
Prunus virginiana – C
Ribes cynosbati – R
Rubus idaeus subsp. strigosus – C
R. occidentalis – R
Sambucus pubens – C
Symphoricarpos albus – R (*C & C 14661*, WIS)
Toxicodendron rydbergii – abundant on top, nearly absent in the good habitat
Viburnum lentago – 5 very low, severely browsed shrubs in one spot
Vitis riparia

FERNS

Adiantum pedatum – one patch
Asplenium rhizophyllum – local; 2 small patches
Athyrium filix-femina – O
Cystopteris bulbifera – very abundant (*C & C 14660*, WIS)
C. tenuis – O (*C & C 14658*, WIS)
C. tenuis – O (pinnae relatively long and narrow, more separated and the distal ones less pinnatifid than usual; *C & C 14659*, WIS)
Dryopteris carthusiana – R
Gymnocarpium dryopteris – a few plants in one spot

HERBS

Actaea rubra – O
Agrimonia sp. – R
Amphicarpaea bracteata – R
Anemone virginiana – O
Apocynum androsaemifolium – R
Aquilegia canadensis – O
Aralia nudicaulis – A
Arabis divaricarpa – R
Arisaema triphyllum – A
Asarum canadense – C
Carex blanda – O
C. deweyana – O
C. eburnea – forming mats, 2 little areas
C. peckii – (C & C 14663, WIS)
C. pensylvanica – A
C. sparganioides – R
Cerastium fontanum – (C & C 14662, OSH, WIS)
Chenopodium simplex – R (2 small plants)
Circaea alpina
[C. lutetiana? – both spp. might well be present]
Cirsium vulgare – R (1 plant)
Dioscorea villosa – R
Festuca subverticillata – R
Fragaria virginiana – O
Galium aparine – R
G. boreale
G. triflorum – O
Geum canadense – O
Hackelia deflexa – O
Hepatica americana – R
Hesperis matronalis – R
Leonurus cardiaca – O
Maianthemum canadense
Monarda fistulosa – R
Osmorhiza claytonii – O
Oxalis stricta (O. europaea) – R
Parietaria pensylvanica – A
Phryma leptostachya – R
Polygonatum pubescens – C
Polygonum virginianum
Pilea sp. – O
Rhamnus cathartica – C
Sanguinaria canadensis – O
Sanicula cf. gregaria – 1 plant

Smilacina racemosa – C
S. stellata
Smilax ecirrhata – R
Thalictrum dioicum – O
Trillium sp.
Urtica dioica
Uvularia sessilifolia – 1 area at base of cliff
Viola pubescens – (C & C 14664, WIS)

Linear depression mimicking intermittent stream along bottom of cliffs

Carex cristatella – R (C & C 14665, WIS)
C. radiata
Erigeron philadelphicus – O (C & C 14666, WIS)
Fragaria virginiana
Geranium maculatum
Glyceria striata
Impatiens capensis
Lycopus americanus
Solanum dulcamara
Symphiotrichum lateriflorum

Appendix 2. Vascular plants identified by Eddy and Harriman

Red Banks SNA, Door County, WI
Plant Species List for 9 June 2007
Submitted by T. L. Eddy & N. A. Harriman

East side of Highway 57

<i>Achillea millefolium</i>	C	
<i>Arabis glabra</i>	O	
<i>Barbarea vulgaris</i>	O	
<i>Berberis thunbergii</i>	R	
<i>Campanula rotundifolia</i>	C	
<i>Carex alopecoidea</i>	O	
<i>Carex deweyana</i>		
<i>Carex granularis</i>	OSH	O
<i>Carex pensylvanica</i>	A	
<i>Carex tetanica</i>	O	
<i>Carya ovata</i>	C	
<i>Cornus racemosa</i>	C	
<i>Dodecatheon meadia</i>	C	
<i>Erigeron pulchellus</i>	A	
<i>Erigeron strigosus</i>	A	
<i>Fragaria virginiana</i>	C	
<i>Galium boreale</i>	OSH	C
<i>Galium aparine</i>	OSH	
<i>Geranium maculatum</i>		
<i>Hieracium aurantiacum</i>	C	
<i>Hieracium caespitosum</i>	OSH	C
<i>Houstonia longifolia</i>	OSH	C
<i>Hypoxis hirsuta</i>	O	
<i>Juniperus communis</i>	C	
<i>Juniperus virginiana</i>	A	
<i>Lithospermum officinale</i>	OSH	C
<i>Lonicera tatarica</i>	C	
<i>Luzula multiflora</i>	OSH	C
<i>Maianthemum canadense</i>	C	
<i>Nepeta cataria</i>	O	
<i>Pedicularis canadensis</i>	OSH	O
<i>Physocarpus opulifolius</i>	OSH	O
<i>Podophyllum peltatum</i>	O	
<i>Polygala senega</i>	OSH	C
<i>Potentilla recta</i>	C	
<i>Potentilla simplex</i>		
<i>Prunella vulgaris</i>	C	

<i>Quercus alba</i>	O
<i>Quercus macrocarpa</i>	C
<i>Quercus rubra</i>	C
<i>Rhamnus cathartica</i>	C
<i>Rosa blanda</i>	OSH
<i>Senecio pauperculus</i>	OSH C
<i>Shepherdia canadensis</i>	OSH C
<i>Smilacina racemosa</i>	
<i>Solanum dulcamara</i>	
<i>Symphoricarpos albus</i>	C
<i>Taenidia integerrima</i>	OSH O
<i>Thalictrum dioicum</i>	C
<i>Tragopogon dubius</i>	O
<i>Veronica officinalis</i>	A
<i>Veronica peregrina var. xalapensis</i>	
<i>Viburnum rafinesquianum</i>	C
<i>Vicia sativa</i>	C
<i>Zizia aurea</i>	

West side of Highway 57

<i>Acer spicatum</i>	R
<i>Actaea rubra</i>	O
<i>Aquilegia canadensis</i>	O
<i>Aralia nudicaulis</i>	OSH C
<i>Arctium minus</i>	
<i>Arisaema triphyllum</i>	C
<i>Asarum canadense</i>	C
<i>Asplenium rhizophyllum</i>	R
<i>Betula papyrifera</i>	C
<i>Carex eburnean</i>	OSH
<i>Caulophyllum thalictroides</i>	O
<i>Circaea lutetiana</i>	C
<i>Cystopteris bulbifera</i>	C
<i>Diervilla lonicera</i>	C
<i>Fraxinus americana</i>	O
<i>Galium triflorum</i>	
<i>Hepatica americana</i>	O
<i>Hesperis matronalis</i>	
<i>Leonurus cardiaca</i>	O
<i>Lithospermum officinale</i>	OSH
<i>Osmorhiza claytonia</i>	O
<i>Oxalis stricta</i>	C
<i>Parthenocissus vitacea</i>	C
<i>Ranunculus fascicularis</i>	O
<i>Ribes cynosbati</i>	O

<i>Rubus idaeus</i>	C	
<i>Sambucus pubens</i>	C	
<i>Sanguinaria canadensis</i>		
<i>Sanicula gregaria</i>		
<i>Smilacina racemosa</i>	C	
<i>Smilax ecirrhata</i>		
<i>Symphoricarpos albus</i>	C	
<i>Thalictrum dioicum</i>	C	
<i>Tilia americana</i>	A	
<i>Thuja occidentalis</i>	A	
<i>Triosteum perfoliatum</i>	OSH	R
<i>Ulmus americana</i>		
<i>Urtica dioica</i>	C	
<i>Viola sororia</i>	C	
<i>Vitis riparia</i>	C	