

To: The Delegates of the National Open

From: Grass Awn Survey Committee

July 2, 2023

Attached find a protocol example from Chris Benda, who prepared the surveys at Pyramid State Park in Illinois for the 2020 NAC. Copy of Chris' 2019 reports attached. Chris' work continues to represent a worthy model for further surveys.

Chris also shared the following:

Regarding your questions and comments:

As far as whom to hire, the person needs to be proficient in the identification of grasses. This is expert level botany and it will likely be difficult to find someone with the qualifications required that is also available for the surveys as many agencies do not permit outside contractual services by their staff. They need not necessarily have any certifications or degrees in the subject, as occasionally, there are non-professionals that might be sufficiently able to identify plants (including grasses) so they might not need to be a professional. I would inquire with local universities, especially USDA soil and water conservation offices and university extension services (that's how Jerry found me).

Distance between tracks - this should be up to the opinion of the surveyor as to how far they can see plants. The issue is that the closer we mandate the tracks to be, the longer it will take to conduct the surveys, depending on how large the field is, and thus the more it will cost. However, I put a 50 meter minimum distance in between passes in the document. The app I use for GPS shows my tracks on my phone in the field so I can ensure that coverage is close enough to identify plants in between tracks. Alternatively, the surveyor can place flagging tape along their route as a guide on the subsequent pass, but then they should really remove the flags when they are done, which would be time consuming and more expensive.

The universal FQA calculator has many databases that can be used depending on the region in question. However, it is true that a database might not be available for that area. It is not essential that it be used, a list in a spreadsheet or other document can suffice for the list of plants encountered. Another note is that there will always be differences in plant names due to taxonomic issues and common names are often misleading or different between regions. When in doubt, ask for the current botanical names per the USDA plants database.

I asked for some sort of listing of the various acronyms that "botanist types" might use, but Chris wasn't able to provide one. Unfortunately this doesn't seem to be a situation where acronyms alone can provide any comfort around qualifications for the task at hand, so each committee will have to interview their potential survey provider and assure themselves that the person/company is adequately knowledgeable to render an opinion and understands the purpose of the project.

Peyton Loss inquired about the committee's work, and we looped her in on the discussion. She made the following additional observations. If the NOC (or ESSFTA, or NAC) wish to form a standing committee on this topic I suggest contacting Peyton to determine if she might be interested in chairing (loss025@umn.edu).

I looked over the "Protocol for Vegetation Survey..." from Chris. I'm unsure which acronyms you mentioned but my two initial thoughts are 1) Random meandering may introduce unconscious bias. An individual may choose or not choose a certain path without even thinking about it. Would

it be worth considering a set number of points, say per acre that are predetermined using GPS? One option would be to do grid sampling or stratified random sampling with quadrats, and 2) it says that the professional will maintain a minimum of 50 meters between tracks. Is that correct? Would it be beneficial to decide on an explicit range so tracks are no closer than 50 meters but no further than say 100?

Additionally, I think this is a great idea and effort put forth by the national committee. Can you catch me up to speed on what the overall objectives are? Is it a goal to have the national committee create a network of professional resources (USDA, SWCD, Extension, etc.) that the interclubs can use to administer these surveys?

Would something similar to the attached document [Grassland Monitoring Team Quality and Invasive Indicators . . .pdf – attached] be useful? If we were to determine based on the USDA Plant Hardiness Zone Map which grasses of interest may be present in each zone it would be a tool that clubs could use to identify their potential risks based on their location and then more easily communicate their needs with their professional cooperator.

Particularly as regards the Nationals, it seems to me that it could be useful to develop an FAQ for the plants of greatest concern (Canada and Virginia wild rye, cheatgrass, mouse barley) by region, and with notes as to what time of year these are the greatest hazard to the best of current knowledge. For National events we have more handlers traveling to areas that they may not be familiar with, so some advance warning seems like it would be particularly helpful. The effort to make sure that the trial cover is safe serves the community well, but we should also be doing what we can to make sure that handlers don't get their dogs in trouble when they are airing them. This suggests that the trial committee look at the airing areas adjacent to the hotel, particularly, and consider whether any mowing or other remediation just prior to the trial would help safeguard the trial participants, whether to post warnings if remediation isn't possible, whether to provide a list/map of safe airing spots in the area, or other such precautions. This would be a great service to those attending.

It's encouraging to see greater interest in this subject. It can be discouraging that there aren't brighter lines to steer the trial committees, but that is no excuse for not making the reasonable efforts to safeguard the dogs. It's certainly not an excuse for doing nothing.

Given the uncertainties, another takeaway is that National committees need to consider this aspect of trial management early on, at least informally. If a property is unsuitable, best to determine that early on to avoid last minute disruptions in planning as well as keep costs of obtaining surveys to the reasonable minimum.

Cathy Lewis
Committee Chair

Committee Members:

John Dunn
Alan Young
Rick Paquin

With thanks to Jerry Barrett for facilitating communications with Chris Benda and Peyton Loss for her input.

Protocols for Vegetation Surveys of Field Trials Sites

Created by Chris Benda, Botanist, Makanda, IL

www.illinoisbotanizer.com

PURPOSE: This document is meant to serve as a guide for conducting vegetation surveys for English Springer Spaniel Field Trials (ESSFT) regarding identifying any plants that might pose a risk for dogs.

PROBLEM: Seeds from some plants found regularly in the cover used for Spaniel field trials can penetrate the dog's skin and/or are inhaled as the dog is questing for game. These seeds can carry problematic bacteria from their environment or pick up bacteria in the mouth as they are inhaled which can create an abscessing infection in the dog's body. Barbed or awned seeds frequently migrate once they enter the dog's body and potentially create more widespread infections. These infections, particularly in the chest cavity or lung, can be debilitating to fatal for the affected dog. In order to safeguard the field trial participants' dogs it is imperative that diligence be exercised to provide as detailed a report as possible to inform participants of the plants present at the site.

SOLUTION: In order to serve the best interests of the field trial participants and their dogs, it is recommended that managers of the field trials hire an agronomist, botanist, or taxonomist to conduct vegetation surveys throughout the grasslands where the field trials are set to occur and provide a report of the findings far enough in advance of an event to allow for changes in plans if significant hazards are found. The hired professional is required to be proficient in the identification of grasses.

MONITORING: The hired professional will thoroughly survey all potential areas that might be used for the field trials. It is recommended that more grasslands than required be selected for the surveys so there are backup sites as a contingency. Surveys should employ a random meander method for inspection of the vegetation present. Using Global Positioning System (GPS), the surveyor will record their tracks to overlay on aerial imagery. The hired professional will maintain a minimum of 50 meters in between tracks to ensure adequate coverage. It is recommended that the surveyor identify all plants encountered during the survey. Plants should be identified to the species level, but in some cases, plants might only be able to be identified to the genus level. Ideally, several surveys throughout the growing season should be conducted, but if that's not possible a qualified botanist should be able to identify most of the dominant vegetation during one visit any time of the year.

The list of plants identified at each site will be entered into the Universal FQA calculator (<https://universalfqa.org/>) if a database is available for the region where the surveys occur. This tool will generate a table with conservation metrics such as species richness, in addition to plant characteristics and botanical and common names for each plant species. FQA stands for Floristic Quality Analysis and is an easy way to consistently present a list of plants and allow participants to understand the natural quality of a site, in a general sense. Sites with higher coefficient of conservatism values (C values) are higher in natural quality and more representative of a site with intact natural community remnants, and therefore to be less infested with "weeds," which includes some of the plants reported to cause problems for dogs. Plant nomenclature will follow whatever database is selected and if none is applicable, the surveyor will present the current botanical and common names for plants as listed on the USDA Plants database, located at <https://plants.usda.gov/home>.

A list of all plants identified and areas surveyed will be provided in a report that will be made available to participants. Areas with potentially problematic plant species will be recorded with GPS and denoted on the map of the areas surveyed. Problematic species will vary from site to site, but generally includes grasses with awns or barbs or plants with other armature. Additionally, photos will be taken, or specimens collected, of each potentially problematic plant species so they can be verified as necessary.

DISCLAIMER: The report serves as a guide for participants to better understand the conditions of the fields where the field trials occur. It is logistically impossible to provide a comprehensive assessment of the areas surveyed. Problematic plants might still occur in the areas surveyed. The surveyor will not be held responsible for issues that arise from the field trials.

ENCLOSURE: The attached report serves as an example of the deliverable that is expected to be submitted to the hiring committee.

Last updated 2/24/2023

Spring Survey of 5 grasslands at Pyramid State Park in Perry County, Illinois



Report by Christopher David Benda, M.S.

March 2019

A survey of 5 grasslands that may be used for field competition exercises at Pyramid State Park in Perry County, Illinois was performed on March 29th and 31st in 2019 (Figure 1.). The objective of the survey was to locate occurrences of plants because some may be harmful to dogs. One resource chronicling these plants of concern, often referred to as “mean seeds” is located at the url <http://www.meanseeds.com/resources/the-bad-grass-list/>.

All vascular plant species encountered in the 5 grasslands were recorded and the list, along with some floristic metrics, is provided (Table 1.). A total of 97 species were observed within the 5 fields (Fig 1-5.). These maps include locations of two plants that are included among the list of “mean seeds” that might be harmful to dogs.

Other plants that inhabit the fields are listed in the report and some may possibly be of concern to dog enthusiasts. This report attempts to inform the reader so that each individual can make his or her own decision regarding their participation in events held at the locations listed in the report. All dog owners, handlers, and participants should review the list of plants and endeavor to become educated with regard to “mean seeds” and make independent decisions regarding the safety of their animals. This report is descriptive in nature and neither its author nor the committee that commissioned it can guarantee the safety of any individual dog from harmful plants. It is impossible to certify any field as 100% clear of harmful plants; however, the providers of this report are confident that each field was surveyed intensively and pertinent information regarding harmless plants is provided.

At least two locations contained some plants of concern. Virginia Wild Rye (*Elymus virginicus*) was observed in small numbers in fields 1 and 3. Field 1 contains approximately 12 plants in a very small area and field 3 contains a 20ft x 20ft patch of approximately 100 plants. Nimblewill (*Muhlenbergia schreberi*) was also mentioned on one of the websites provided in the initial request and was observed on the NW edge of field 2. These locations are indicated on the maps provided. The areas not surveyed in field 5 were mowed at the time of the survey. Other areas in many of the fields contained dense stands of Common Reed (*Phragmites australis*).

Additionally, the maps contain the tracks the two botanists followed in each field. Another survey is planned for August 2019.

Note: It is impossible to guarantee that any of the harmful plants are not present in each field and the providers of this survey are not liable for any issues that may occur in these fields during the competition. However, we are confident that each field was adequately surveyed.

Pyramid State Park
3/31/2019
Practitioner: Chris Benda

Conservatism Metrics:

Total Mean C:	1.3
Native Mean C:	2.2
Total FQI:	12.8
Native FQI:	16.6
Adjusted FQI:	16.9
% C value 0:	51.5
% C value 1-3:	34
% C value 4-6:	14.4
% C value 7-10:	0
Native Tree Mean C:	2.4
Native Shrub Mean C:	2
Native Herbaceous Mean C:	2.2

Species Richness:

Total Species:	97	
Native Species:	57	58.80%
Non-native Species:	40	41.20%

Species Wetness:

Mean Wetness:	1.5
Native Mean Wetness:	0.4

Physiognomy Metrics:

Tree:	8	8.20%
Shrub:	7	7.20%
Vine:	1	1%
Forb:	64	66%
Grass:	16	16.50%
Sedge:	1	1%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

Duration Metrics:

Annual:	28	28.90%
Perennial:	58	59.80%
Biennial:	11	11.30%
Native Annual:	11	11.30%
Native Perennial:	42	43.30%
Native Biennial:	4	4.10%

Species:

Scientific Name	Native?	C	Physiognomy	Duration	Common Name
<i>Acer negundo</i>	native	1	tree	perennial	boxelder
<i>Achillea millefolium</i>	non-native	0	forb	perennial	common milfoil
<i>Agrimonia parviflora</i>	native	5	forb	perennial	swamp agrimony
<i>Alisma plantago-aquatica v. parviflorum</i>	native	2	forb	perennial	common water plantain
<i>Allium vineale</i>	non-native	0	forb	perennial	field garlic
<i>Ambrosia trifida</i>	native	0	forb	annual	giant ragweed
<i>Andropogon gerardii</i>	native	5	grass	perennial	big bluestem
<i>Andropogon virginicus</i>	native	1	grass	perennial	broom sedge
<i>Apocynum cannabinum</i>	native	2	forb	perennial	dogbane
<i>Arabidopsis thaliana</i>	non-native	0	forb	annual	mouse-eared cress
<i>Arenaria serpyllifolia</i>	non-native	0	forb	annual	thyme-leaved sandwort
<i>Asclepias syriaca</i>	native	0	forb	perennial	common milkweed
<i>Aster lateriflorus</i>	native	2	forb	perennial	side-flowering aster
<i>Barbarea vulgaris</i>	non-native	0	forb	biennial	winter cress
<i>Boehmeria cylindrica</i>	native	3	forb	perennial	false nettle
<i>Bromus inermis</i>	non-native	0	grass	perennial	hungarian brome
<i>Capsella bursa-pastoris</i>	non-native	0	forb	annual	shepherds purse
<i>Cardamine hirsuta</i>	non-native	0	forb	annual	hairy bitter cress
<i>Carex glaucoidea</i>	native	5	sedge	perennial	blue sedge
<i>Celtis occidentalis</i>	native	3	tree	perennial	hackberry
<i>Cerastium dubium</i>	non-native	0	forb	annual	three-styled chickweed
<i>Cirsium discolor</i>	native	3	forb	biennial	pasture thistle
<i>Cirsium vulgare</i>	non-native	0	forb	biennial	bull thistle
<i>Conium maculatum</i>	non-native	0	forb	biennial	poison hemlock
<i>Coryza canadensis</i>	native	0	forb	annual	horseweed
<i>Cornus drummondii</i>	native	2	shrub	perennial	rough-leaved dogwood
<i>Corydalis flavula</i>	native	5	forb	biennial	pale corydalis
<i>Daucus carota</i>	non-native	0	forb	biennial	queen annes lace
<i>Digitaria sanguinalis</i>	non-native	0	grass	annual	hairy crab grass
<i>Dipsacus laciniatus</i>	non-native	0	forb	biennial	cut-leaved teasel
<i>Dipsacus sylvestris</i>	non-native	0	forb	biennial	common teasel
<i>Draba brachycarpa</i>	native	2	forb	annual	whitlow grass
<i>Elaeagnus umbellata</i>	non-native	0	shrub	perennial	autumn olive
<i>Elymus virginicus</i>	native	4	grass	perennial	virginia wild rye
<i>Erigeron philadelphicus</i>	native	3	forb	perennial	marsh fleabane
<i>Eupatorium coelestinum</i>	native	3	forb	perennial	mistflower
<i>Galium aparine</i>	native	0	forb	annual	annual bedstraw
<i>Galium pedemontanum</i>	non-native	0	forb	annual	foothill bedstraw
<i>Geranium carolinianum</i>	native	2	forb	annual	carolina cranesbill
<i>Gleditsia triacanthos</i>	native	2	tree	perennial	honey locust
<i>Helianthus tuberosus</i>	native	3	forb	perennial	jerusalem artichoke

<i>Holosteum umbellatum</i>	non-native	0	forb	annual	jagged chickweed
<i>Juncus dudleyi</i>	native	4	forb	perennial	dudleys rush
<i>Juncus effusus v. solutus</i>	native	4	forb	perennial	common rush
<i>Juniperus virginiana</i>	native	1	tree	perennial	eastern red cedar
<i>Lactuca canadensis</i>	native	1	forb	biennial	wild lettuce
<i>Lamium amplexicaule</i>	non-native	0	forb	annual	henbit
<i>Lepidium virginicum</i>	native	0	forb	annual	common peppergrass
<i>Lespedeza cuneata</i>	non-native	0	forb	perennial	silky bush clover
<i>Lonicera japonica</i>	non-native	0	vine	perennial	japanese honeysuckle
<i>Lonicera maackii</i>	non-native	0	shrub	perennial	amur honeysuckle
<i>Lotus corniculatus</i>	non-native	0	forb	perennial	birdsfoot trefoil
<i>Medicago lupulina</i>	non-native	0	forb	annual	black medick
<i>Medicago sativa</i>	non-native	0	forb	perennial	alfalfa
<i>Muhlenbergia schreberi</i>	native	0	grass	perennial	nimblewill
<i>Oenothera biennis</i>	native	1	forb	biennial	evening primrose
<i>Oxalis stricta</i>	native	0	forb	perennial	tall wood sorrel
<i>Panicum capillare</i>	native	0	grass	annual	old witch grass
<i>Panicum virgatum</i>	native	4	grass	perennial	prairie switch grass
<i>Phragmites australis</i>	native	1	grass	perennial	common reed
<i>Phytolacca americana</i>	native	1	forb	perennial	pokeweed
<i>Plantago lanceolata</i>	non-native	0	forb	perennial	english plantain
<i>Platanus occidentalis</i>	native	3	tree	perennial	buttonwood
<i>Poa pratensis</i>	non-native	0	grass	perennial	kentucky blue grass
<i>Populus deltoides</i>	native	2	tree	perennial	eastern cottonwood
<i>Potentilla simplex</i>	native	3	forb	perennial	common cinquefoil
<i>Pycnanthemum tenuifolium</i>	native	4	forb	perennial	slender mountain mint
<i>Quercus palustris</i>	native	4	tree	perennial	pin oak
<i>Ranunculus abortivus</i>	native	1	forb	annual	little-leaf buttercup
<i>Rhus copallina</i>	native	3	shrub	perennial	dwarf sumac
<i>Rhus glabra</i>	native	1	shrub	perennial	smooth sumac
<i>Rosa multiflora</i>	non-native	0	shrub	perennial	japanese rose
<i>Rubus allegheniensis</i>	native	2	shrub	perennial	common blackberry
<i>Rumex verticillatus</i>	native	5	forb	perennial	swamp dock
<i>Salix nigra</i>	native	3	tree	perennial	black willow
<i>Schizachyrium scoparium</i>	native	5	grass	perennial	little bluestem
<i>Setaria glauca</i>	non-native	0	grass	annual	pigeon grass
<i>Solidago canadensis</i>	native	1	forb	perennial	canada goldenrod
<i>Sonchus arvensis</i>	non-native	0	forb	perennial	field sow thistle
<i>Sorghastrum nutans</i>	native	4	grass	perennial	indian grass
<i>Sporobolus asper</i>	native	3	grass	perennial	rough dropseed
<i>Stellaria pallida</i>	non-native	0	forb	annual	sand chickweed
<i>Taraxacum officinale</i>	non-native	0	forb	perennial	common dandelion
<i>Thlaspi arvense</i>	non-native	0	forb	annual	field penny cress
<i>Tridens flavus</i>	native	1	grass	perennial	common purpletop
<i>Trifolium repens</i>	non-native	0	forb	perennial	white clover

<i>Triticum aestivum</i>	non-native	0	grass	annual	wheat
<i>Typha angustifolia</i>	non-native	0	forb	perennial	narrow-leaved cattail
<i>Valerianella radiata</i>	native	1	forb	annual	corn salad
<i>Verbascum thapsus</i>	non-native	0	forb	biennial	woolly mullein
<i>Verbena hastata</i>	native	3	forb	perennial	blue vervain
<i>Vernonia gigantea</i>	native	4	forb	perennial	tall iron weed
<i>Veronica arvensis</i>	non-native	0	forb	annual	corn speedwell
<i>Veronica peregrina</i>	native	0	forb	annual	purslane speedwell
<i>Vicia dasycarpa</i>	non-native	0	forb	annual	woolly-pod vetch
<i>Viola rafinesquii</i>	non-native	0	forb	annual	wild pansy
<i>Xanthium strumarium</i>	native	0	forb	annual	cocklebur

Figure 1. Field 1 at Pyramid State Park.

Fields at Pyramid State Park

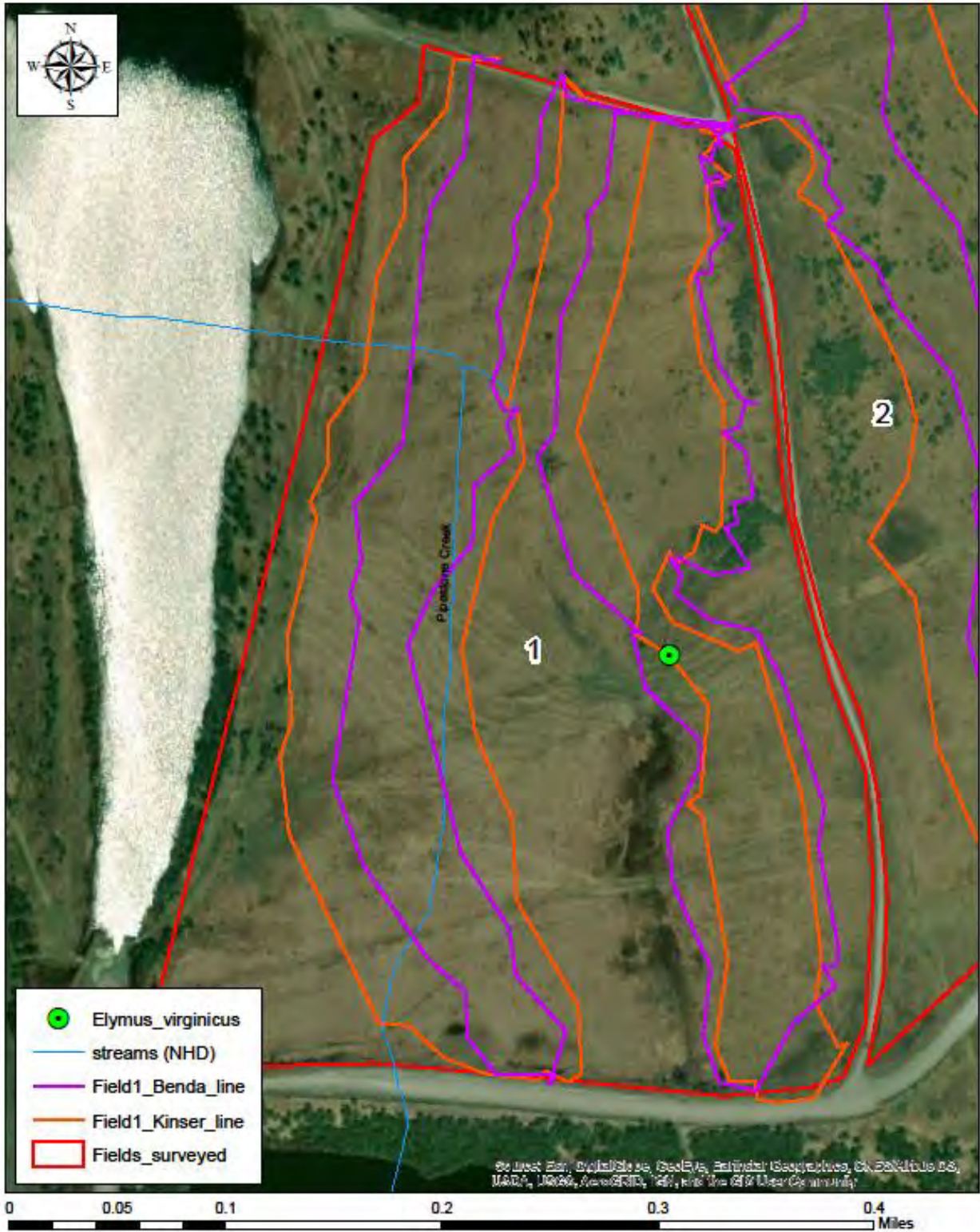


Figure 2. Field 2 at Pyramid State Park.

Fields at Pyramid State Park

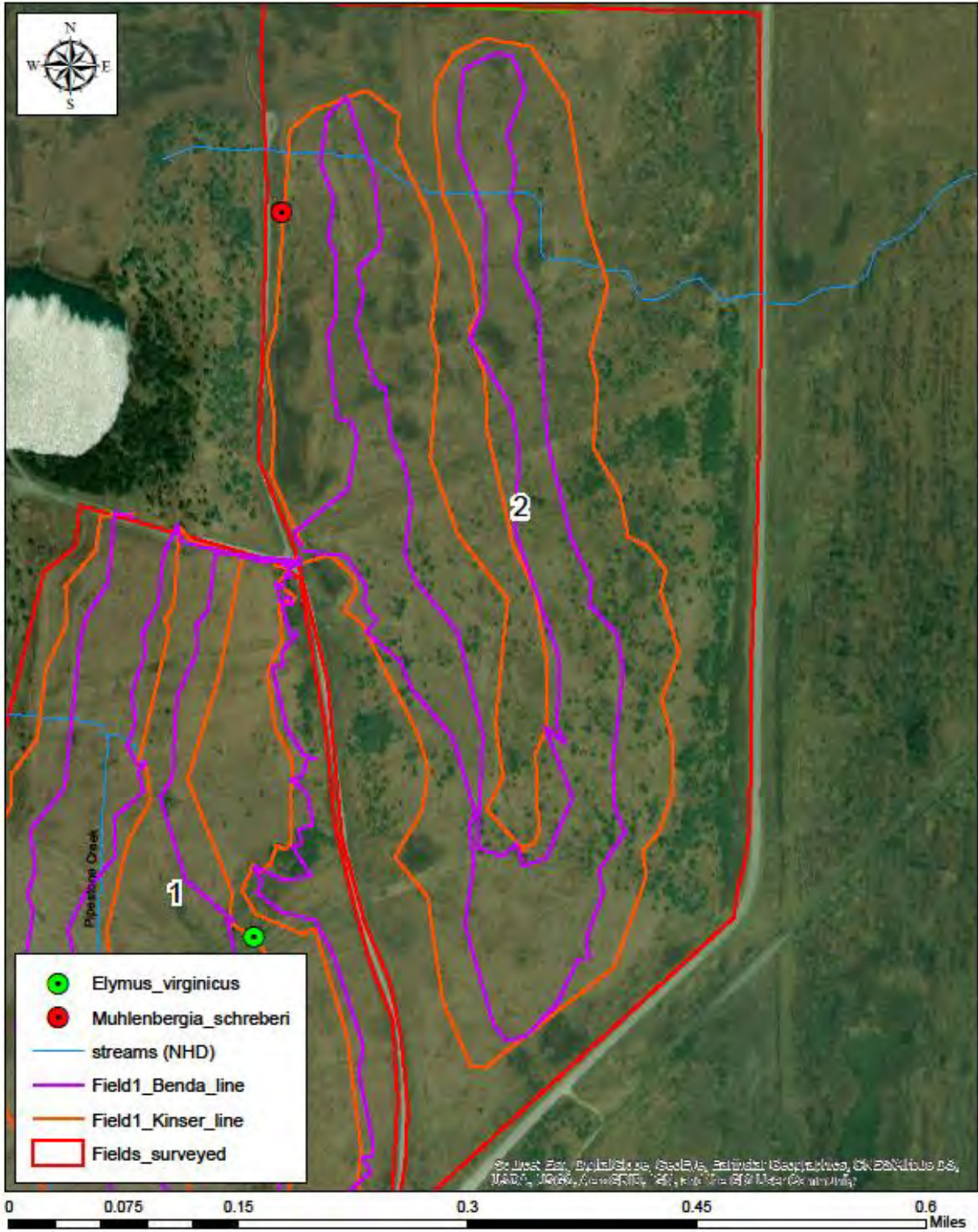


Figure 3. Field 3 at Pyramid State Park.

Fields at Pyramid State Park

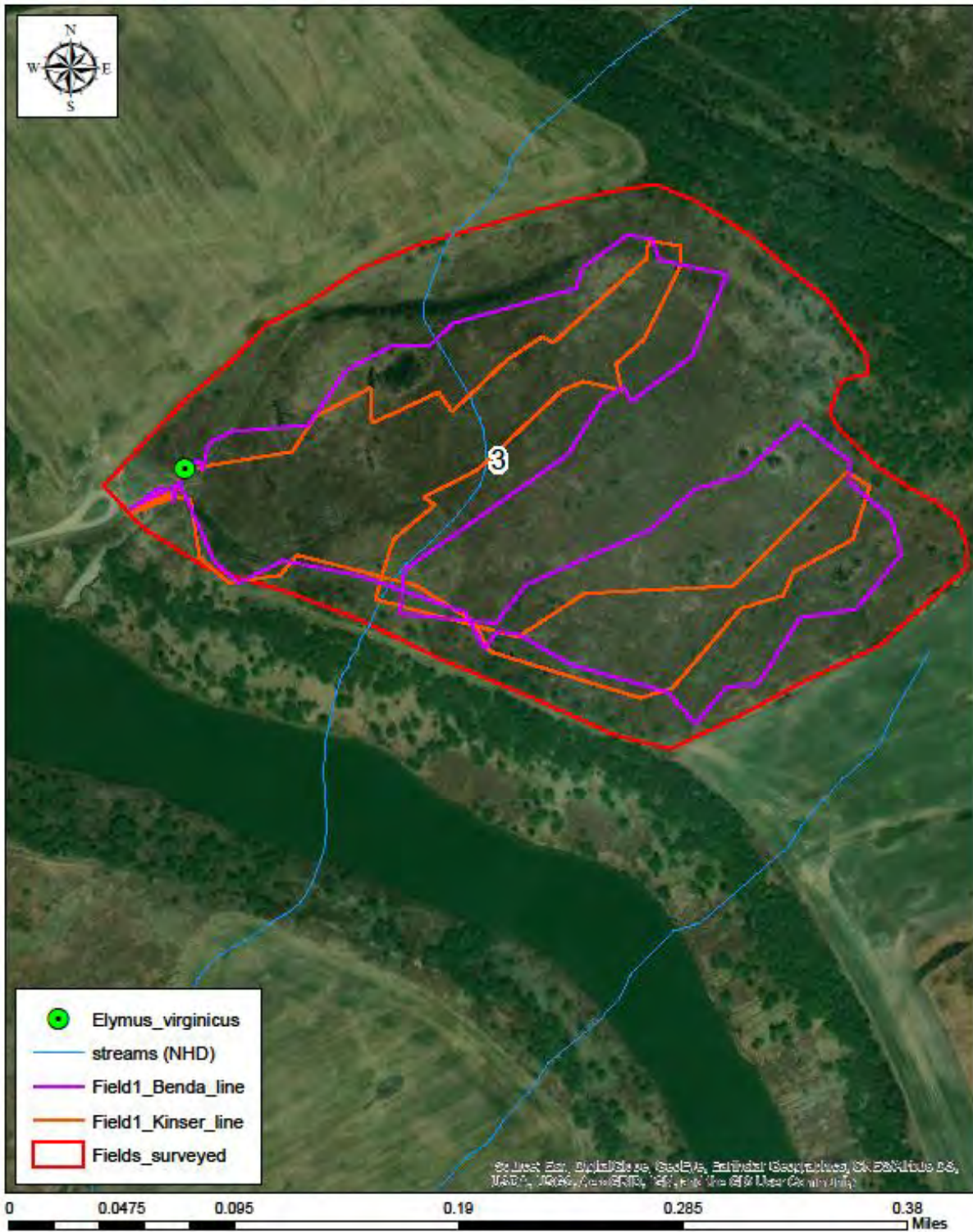


Figure 4. Field 4 at Pyramid State Park.

Fields at Pyramid State Park

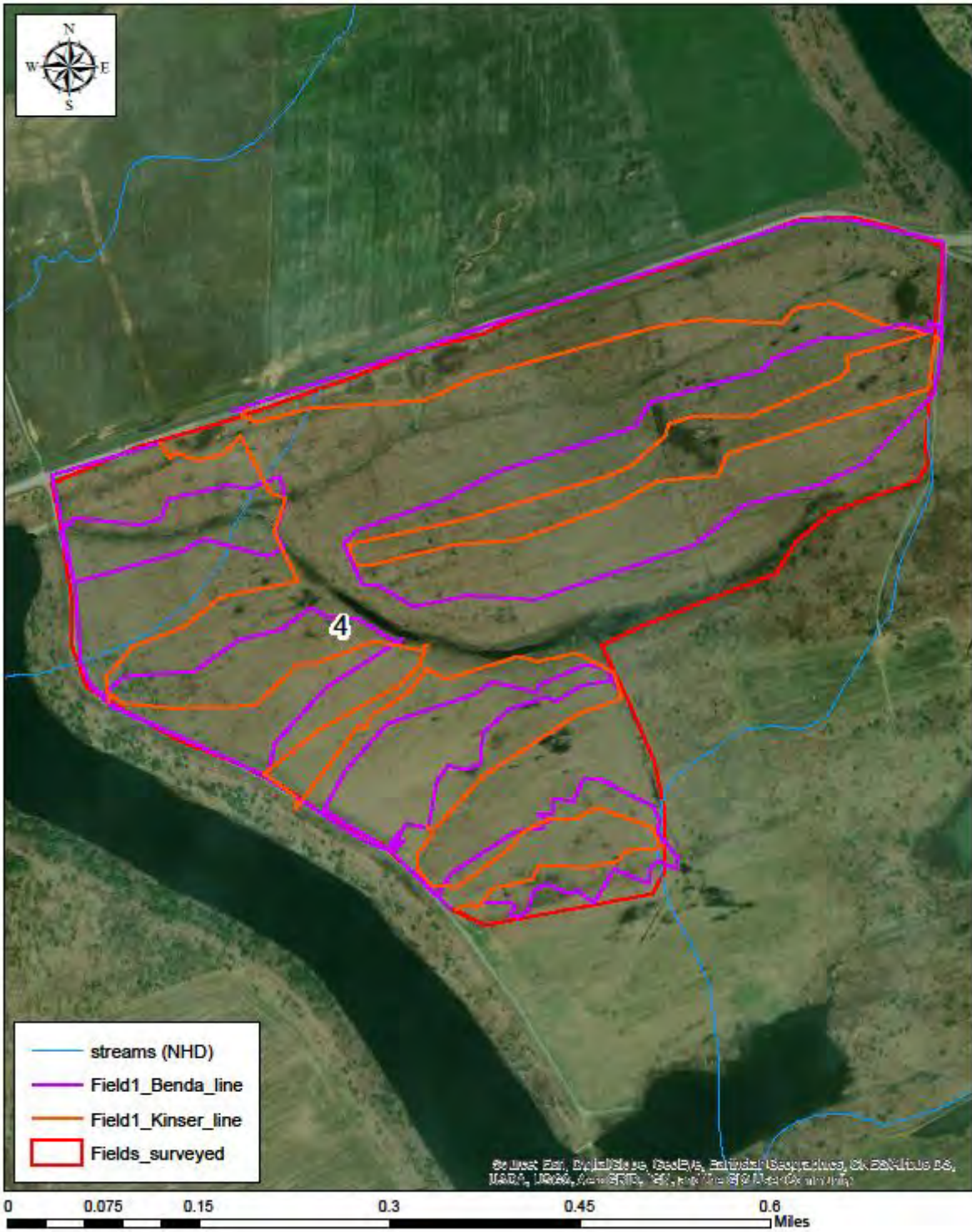


Figure 5. Field 5 at Pyramid State Park.

Fields at Pyramid State Park



Summer Survey of 5 grasslands at Pyramid State Park in Perry County, Illinois



**Report by Christopher David Benda, M.S.
www.illinoisbotanizer.com**

August 2019

A survey of 5 grasslands that may be used for field competition exercises at Pyramid State Park in Perry County, Illinois was performed on August 12th and 13th in 2019 (Figure 1.). The objective of the survey was to locate occurrences of plants because some may be harmful to dogs. One resource chronicling these plants of concern, often referred to as “mean seeds” is located at the URL <http://www.meanseeds.com/resources/the-bad-grass-list/>.

All vascular plant species encountered in the 5 grasslands were recorded and the list, along with some floristic metrics, is provided (Table 1.). A total of 206 species were observed within the 5 fields (Fig 1-5.) during the March and August surveys in 2019. Nomenclature follows Taft *et al.* 1997, Floristic Quality Assessment for Vegetation in Illinois, A Method for Assessing Vegetation Integrity (<https://illinois.org/erigenia/#15>). There are 4 species that are not in table 1 (or floristic quality analysis) because of taxonomic reasons and include *Carex aureolensis*, *Carex mesochorea*, *Chamaesyce nutans*, and *Polygonum coccinea*. A total of 52 species of the 97 species located last spring were relocated during the summer surveys. An additional 109 species were added to the total list during the summer surveys (Table 2.).

Figures 1-5 are maps that include several locations found during the summer survey of one plant species (Virginia Wild Rye, *Elymus virginicus*) that is included among the list of “mean seeds” that might be harmful to dogs. Additionally, the maps contain the tracks the two botanists followed in each field during both the spring and summer surveys.

At least 3 fields contained some plants of concern. Field 1 has 4 *Elymus virginicus* populations that occur within the tall Common Reed (*Phragmites australis*) in the ditches to the south. Field 3 has 4 *Elymus virginicus* populations that occur near the front of the field by the parking area (southern edge). Field 4 has many *Elymus virginicus* populations in the ditches in between the fields. This field was also partially mowed during the summer survey. These locations are indicated on the maps provided and GPS coordinates for each occurrence of *Elymus virginicus* are also provided in Table 3 and follow the WGS 1984 projection system. Nimblewill (*Muhlenbergia schreberi*) was also mentioned on one of the websites provided in the initial request and was observed on the NW edge of field 2 during the spring survey, but the plants were not relocated during the summer survey.

Other plants that inhabit the fields are listed in the tables and some may possibly be of concern to dog enthusiasts. This report attempts to inform the reader so that each individual can make his or her own decision regarding their participation in events held at the locations listed in the report. All dog owners, handlers, and participants should review the list of plants and endeavor to become educated with regard to “mean seeds” and make independent decisions regarding the safety of their animals. This report is descriptive in nature and neither its author nor the committee that commissioned it can guarantee the safety of any individual dog from harmful plants. It is impossible to certify any field as 100% clear of harmful plants; however, the providers of this report are confident that each field was surveyed intensively and pertinent information regarding harmless plants is provided.

Table 1. Total Species List for 5 Grasslands at Pyramid State Park.

8/13/2019

Practitioners:

Chris Benda & Abel Kinser

Conservatism-Based Metrics:

Total Mean C:	1.6
Native Mean C:	2.5
Total FQI:	22.7
Native FQI:	28.6
Adjusted FQI:	20.1
% C value 0:	46.5
% C value 1-3:	34.2
% C value 4-6:	17.8
% C value 7-10:	1.5
Native Tree Mean C:	2.4
Native Shrub Mean C:	2
Native Herbaceous Mean C:	2.5

Species Richness:

Total Species:	202	
Native Species:	131	64.90%
Non-native Species:	71	35.10%

Species Wetness:

Mean Wetness:	0.9
Native Mean Wetness:	-0.1

Physiognomy Metrics:

Tree:	12	5.90%
Shrub:	7	3.50%
Vine:	5	2.50%
Forb:	125	61.90%
Grass:	38	18.80%
Sedge:	15	7.40%

Duration Metrics:

Annual:	60	29.70%
Perennial:	123	60.90%
Biennial:	19	9.40%
Native Annual:	32	15.80%
Native Perennial:	93	46%
Native Biennial:	6	3%

Species:

Scientific Name	Native?	C value	Physiognomy	Duration	Common Name
<i>Acalypha gracilens</i>	native	4	forb	annual	slender three-seeded mercury three-seeded
<i>Acalypha virginica</i>	native	2	forb	annual	mercury
<i>Acer negundo</i>	native	1	tree	perennial	boxelder
<i>Achillea millefolium</i>	non-native	0	forb	perennial	common milfoil
<i>Agrimonia parviflora</i>	native	5	forb	perennial	swamp agrimony
<i>Agropyron repens</i>	non-native	0	grass	perennial	quack grass
<i>Agrostis alba</i>	native	0	grass	perennial	red top
<i>Alisma plantago-aquatica v. parviflorum</i>	native	2	forb	perennial	common water plantain
<i>Allium vineale</i>	non-native	0	forb	perennial	field garlic
<i>Ambrosia artemisiifolia</i>	native	0	forb	annual	common ragweed
<i>Ambrosia trifida</i>	native	0	forb	annual	giant ragweed long-leaved
<i>Ammannia coccinea</i>	native	5	forb	annual	ammannia
<i>Andropogon gerardii</i>	native	5	grass	perennial	big bluestem
<i>Andropogon virginicus</i>	native	1	grass	perennial	broom sedge
<i>Apocynum cannabinum</i>	native	2	forb	perennial	dogbane
<i>Arabidopsis thaliana</i>	non-native	0	forb	annual	mouse-eared cress thyme-leaved
<i>Arenaria serpyllifolia</i>	non-native	0	forb	annual	sandwort
<i>Asclepias hirtella</i>	native	6	forb	perennial	tall green milkweed
<i>Asclepias incarnata</i>	native	4	forb	perennial	swamp milkweed
<i>Asclepias syriaca</i>	native	0	forb	perennial	common milkweed
<i>Aster lateriflorus</i>	native	2	forb	perennial	side-flowering aster
<i>Aster pilosus</i>	native	0	forb	perennial	hairy aster
<i>Barbarea vulgaris</i>	non-native	0	forb	biennial	winter cress
<i>Bidens aristosa v. retrorsa</i>	native	1	forb	annual	bur marigold purplestemmed
<i>Bidens connata</i>	native	2	forb	annual	tickseed
<i>Bidens vulgata</i>	native	0	forb	annual	tall beggars ticks
<i>Boehmeria cylindrica</i>	native	3	forb	perennial	false nettle
<i>Bouteloua curtipendula</i>	native	7	grass	perennial	side-oats grama
<i>Bromus arvensis</i>	non-native	0	grass	perennial	chess
<i>Bromus inermis</i>	non-native	0	grass	perennial	hungarian brome
<i>Campsis radicans</i>	native	2	vine	perennial	trumpet creeper
<i>Capsella bursa-pastoris</i>	non-native	0	forb	annual	shepherds purse
<i>Cardamine hirsuta</i>	non-native	0	forb	annual	hairy bitter cress
<i>Carduus nutans</i>	non-native	0	forb	biennial	musk bristle thistle
<i>Carex blanda</i>	native	2	sedge	perennial	common wood sedge
<i>Carex festucacea</i>	native	6	sedge	perennial	fescue oval sedge
<i>Carex frankii</i>	native	4	sedge	perennial	bristly cattail sedge

<i>Carex glaucoidea</i>	native	5	sedge	perennial	blue sedge
<i>Carex hirsutella</i>	native	5	sedge	perennial	hairy green sedge narrow-leaved cattail
<i>Carex squarrosa</i>	native	5	sedge	perennial	sedge awl-fruited oval
<i>Carex tribuloides</i>	native	3	sedge	perennial	sedge
<i>Carex vulpinoidea</i>	native	3	sedge	perennial	brown fox sedge
<i>Cassia fasciculata</i>	native	1	forb	annual	golden cassia
<i>Cassia marilandica</i>	native	4	forb	perennial	maryland senna
<i>Celtis occidentalis</i>	native	3	tree	perennial	hackberry three-styled
<i>Cerastium dubium</i>	non-native	0	forb	annual	chickweed spotted creeping
<i>Chamaesyce supina</i>	native	0	forb	annual	spurge
<i>Cirsium discolor</i>	native	3	forb	biennial	pasture thistle
<i>Cirsium vulgare</i>	non-native	0	forb	biennial	bull thistle
<i>Conium maculatum</i>	non-native	0	forb	biennial	poison hemlock
<i>Conyza canadensis</i>	native	0	forb	annual	horseweed rough-leaved
<i>Cornus drummondii</i>	native	2	shrub	perennial	dogwood
<i>Corydalis flavula</i>	native	5	forb	biennial	pale corydalis
<i>Croton capitatus</i>	native	0	forb	annual	hogwort
<i>Croton monanthogynus</i>	native	2	forb	annual	prairie tea
<i>Cynanchum laeve</i>	native	1	vine	perennial	blue vine
<i>Cyperus esculentus</i>	native	0	sedge	perennial	field nut sedge
<i>Cyperus ovularis</i>	native	2	sedge	perennial	hedgehog club rush longl-scaled nut
<i>Cyperus strigosus</i>	native	0	sedge	perennial	sedge
<i>Dactylis glomerata</i>	non-native	0	grass	perennial	orchard grass
<i>Daucus carota</i>	non-native	0	forb	biennial	queen annes lace
<i>Desmanthus illinoensis</i>	native	4	forb	perennial	illinois bundle flower
<i>Digitaria sanguinalis</i>	non-native	0	grass	annual	hairy crab grass
<i>Diospyros virginiana</i>	native	2	tree	perennial	persimmon
<i>Dipsacus laciniatus</i>	non-native	0	forb	biennial	cut-leaved teasel
<i>Dipsacus sylvestris</i>	non-native	0	forb	biennial	common teasel short-fruited whitlow
<i>Draba brachycarpa</i>	native	2	forb	annual	grass
<i>Echinochloa crusgalli</i>	non-native	0	grass	annual	barnyard grass
<i>Echinochloa muricata</i>	native	0	grass	annual	spiny barnyard grass
<i>Elaeagnus umbellata</i>	non-native	0	shrub	perennial	autumn olive
<i>Eleocharis elliptica v. compressa</i>	native	7	sedge	perennial	flat-stemmed spike rush
<i>Eleocharis obtusa</i>	native	2	sedge	annual	blunt spike rush
<i>Eleocharis palustris</i>	native	8	sedge	perennial	great spike rush
<i>Eleusine indica</i>	non-native	0	grass	annual	crowfoot grass
<i>Elymus virginicus</i>	native	4	grass	perennial	virginia wild rye

<i>Eragrostis minor</i>	non-native	0	grass	annual	lesser love grass
<i>Eragrostis pectinacea</i>	native	0	grass	annual	small love grass
<i>Eragrostis spectabilis</i>	native	3	grass	perennial	purple love grass
<i>Erechtites hieracifolia</i>	native	2	forb	annual	fireweed
<i>Erigeron annuus</i>	native	1	forb	biennial	annual fleabane
<i>Erigeron philadelphicus</i>	native	3	forb	perennial	marsh fleabane
<i>Eriochloa contracta</i>	non-native	0	grass	annual	prairie cup grass
<i>Eupatorium altissimum</i>	native	2	forb	perennial	tall boneset
<i>Eupatorium coelestinum</i>	native	3	forb	perennial	mistflower
<i>Eupatorium perfoliatum</i>	native	4	forb	perennial	common boneset
<i>Eupatorium serotinum</i>	native	1	forb	perennial	late boneset
					grass-leaved
<i>Euthamia graminifolia</i>	native	3	forb	perennial	goldenrod
<i>Festuca pratensis</i>	non-native	0	grass	perennial	meadow fescue
<i>Galium aparine</i>	native	0	forb	annual	annual bedstraw
<i>Galium pedemontanum</i>	non-native	0	forb	annual	foothill bedstraw
<i>Gaura parviflora</i>	non-native	0	forb	biennial	small-flowered gaura
<i>Geranium carolinianum</i>	native	2	forb	annual	carolina cranesbill
<i>Gleditsia triacanthos</i>	native	2	tree	perennial	honey locust
<i>Gnaphalium obtusifolium</i>	native	2	forb	biennial	old-field balsam
<i>Helianthus annuus</i>	non-native	0	forb	annual	common sunflower
<i>Hibiscus lasiocarpus</i>	native	5	forb	perennial	hairy rose mallow
<i>Holosteum umbellatum</i>	non-native	0	forb	annual	jagged chickweed
					spotted st. johns
<i>Hypericum punctatum</i>	native	3	forb	perennial	wort
<i>Ipomoea pandurata</i>	native	2	forb	perennial	wild sweet potato
<i>Iva annua</i>	native	0	forb	annual	marsh elder
<i>Juncus acuminatus</i>	native	4	forb	perennial	sharp-fruited rush
<i>Juncus biflorus</i>	native	5	forb	perennial	two-flowered rush
<i>Juncus dudleyi</i>	native	4	forb	perennial	dudleys rush
<i>Juncus effusus v. solutus</i>	native	4	forb	perennial	common rush
<i>Juncus tenuis</i>	native	0	forb	perennial	path rush
<i>Juncus torreyi</i>	native	3	forb	perennial	torreys rush
<i>Juniperus virginiana</i>	native	1	tree	perennial	eastern red cedar
<i>Kummerowia striata</i>	non-native	0	forb	annual	japanese lespedeza
<i>Lactuca canadensis</i>	native	1	forb	biennial	wild lettuce
<i>Lactuca saligna</i>	non-native	0	forb	biennial	willow-leaved lettuce
<i>Lactuca serriola</i>	non-native	0	forb	biennial	prickly lettuce
<i>Lamium amplexicaule</i>	non-native	0	forb	annual	henbit
<i>Leersia oryzoides</i>	native	3	grass	perennial	rice cut grass
					common
<i>Lepidium virginicum</i>	native	0	forb	annual	peppergrass
<i>Lespedeza cuneata</i>	non-native	0	forb	perennial	silky bush clover
					japanese
<i>Lonicera japonica</i>	non-native	0	vine	perennial	honeysuckle

<i>Lonicera maackii</i>	non-native	0	shrub	perennial	amur honeysuckle
<i>Lotus corniculatus</i>	non-native	0	forb	perennial	birdsfoot trefoil
<i>Ludwigia palustris</i> v. <i>americana</i>	native	4	forb	perennial	marsh purslane
<i>Ludwigia peploides</i> v. <i>glabrescens</i>	native	5	forb	perennial	creeping primrose willow common water
<i>Lycopus americanus</i>	native	3	forb	perennial	horehound
<i>Medicago lupulina</i>	non-native	0	forb	annual	black medick
<i>Medicago sativa</i>	non-native	0	forb	perennial	alfalfa
<i>Melilotus alba</i>	non-native	0	forb	biennial	white sweet clover
<i>Melilotus officinalis</i>	non-native	0	forb	biennial	yellow sweet clover winged monkey
<i>Mimulus alatus</i>	native	6	forb	perennial	flower
<i>Morus alba</i>	non-native	0	tree	perennial	white mulberry
<i>Morus rubra</i>	native	4	tree	perennial	red mulberry
<i>Muhlenbergia schreberi</i>	native	0	grass	perennial	nimblewill common evening
<i>Oenothera biennis</i>	native	1	forb	biennial	primrose
<i>Oxalis stricta</i>	native	0	forb	perennial	tall wood sorrel
<i>Panicum capillare</i>	native	0	grass	annual	old witch grass philadelphia panic
<i>Panicum philadelphicum</i>	native	5	grass	annual	grass
<i>Panicum virgatum</i>	native	4	grass	perennial	prairie switch grass
<i>Paspalum laeve</i>	native	2	grass	perennial	smooth lens grass
<i>Paspalum pubiflorum</i> v. <i>glabrum</i>	native	3	grass	perennial	four-rowed bead grass
<i>Passiflora incarnata</i>	native	3	vine	perennial	large passion flower
<i>Phalaris arundinacea</i>	non-native	0	grass	perennial	reed canary grass
<i>Phleum pratense</i>	non-native	0	grass	perennial	timothy
<i>Phragmites australis</i>	native	1	grass	perennial	common reed
<i>Phyla lanceolata</i>	native	1	forb	perennial	fog fruit
<i>Physalis longifolia</i>	non-native	0	forb	perennial	tall ground cherry
<i>Phytolacca americana</i>	native	1	forb	perennial	pokeweed
<i>Plantago aristata</i>	native	1	forb	annual	poor joe
<i>Plantago lanceolata</i>	non-native	0	forb	perennial	english plantain
<i>Plantago major</i>	non-native	0	forb	perennial	common plantain
<i>Platanus occidentalis</i>	native	3	tree	perennial	buttonwood
<i>Poa compressa</i>	non-native	0	grass	perennial	canadian blue grass
<i>Poa pratensis</i>	non-native	0	grass	perennial	kentucky blue grass
<i>Polygonum hydropiperoides</i>	native	4	forb	perennial	mild water pepper
<i>Polygonum persicaria</i>	non-native	0	forb	annual	lady's thumb
<i>Polygonum punctatum</i>	native	3	forb	annual	smartweed
<i>Populus deltoides</i>	native	2	tree	perennial	eastern cottonwood
<i>Portulaca oleracea</i>	non-native	0	forb	annual	purslane

<i>Potentilla simplex</i>	native	3	forb	perennial	common cinquefoil slender mountain
<i>Pycnanthemum tenuifolium</i>	native	4	forb	perennial	mint
<i>Pyrrhopappus carolinianus</i>	native	1	forb	annual	false dandelion
<i>Quercus palustris</i>	native	4	tree	perennial	pin oak
<i>Ranunculus abortivus</i>	native	1	forb	annual	little-leaf buttercup
<i>Rhus copallina</i>	native	3	shrub	perennial	dwarf sumac
<i>Rhus glabra</i>	native	1	shrub	perennial	smooth sumac
<i>Robinia pseudo-acacia</i>	native	1	tree	perennial	black locust
<i>Rosa multiflora</i>	non-native	0	shrub	perennial	japanese rose
<i>Rubus allegheniensis</i>	native	2	shrub	perennial	common blackberry
<i>Rudbeckia hirta</i>	native	2	forb	perennial	black-eyed susan
<i>Rumex crispus</i>	non-native	0	forb	perennial	curly dock
<i>Rumex verticillatus</i>	native	5	forb	perennial	swamp dock
<i>Salix nigra</i>	native	3	tree	perennial	black willow
<i>Schizachyrium scoparium</i>	native	5	grass	perennial	little bluestem bristleless dark green
<i>Scirpus georgianus</i>	native	4	sedge	perennial	rush
<i>Setaria faberi</i>	non-native	0	grass	annual	giant foxtail
<i>Setaria glauca</i>	non-native	0	grass	annual	pigeon grass
<i>Sida spinosa</i>	non-native	0	forb	annual	prickly sida
<i>Solanum carolinense</i>	native	0	forb	perennial	horse nettle
<i>Solidago canadensis</i>	native	1	forb	perennial	canada goldenrod
<i>Sonchus arvensis</i>	non-native	0	forb	perennial	field sow thistle
<i>Sorghastrum nutans</i>	native	4	grass	perennial	indian grass
<i>Sorghum halepense</i>	non-native	0	grass	perennial	johnson grass
<i>Sporobolus asper</i>	native	3	grass	perennial	rough dropseed
<i>Stellaria pallida</i>	non-native	0	forb	annual	sand chickweed
<i>Strophostyles leiosperma</i>	native	4	forb	annual	small wild bean
<i>Taraxacum officinale</i>	non-native	0	forb	perennial	common dandelion
<i>Teucrium canadense v. boreale</i>	native	3	forb	perennial	gray germander
<i>Thlaspi arvense</i>	non-native	0	forb	annual	field penny cress
<i>Torilis arvensis</i>	non-native	0	forb	annual	field hedge parsley
<i>Toxicodendron radicans</i>	native	1	vine	perennial	poison ivy
<i>Tridens flavus</i>	native	1	grass	perennial	common purpletop
<i>Trifolium hybridum</i>	non-native	0	forb	perennial	alsike clover
<i>Trifolium pratense</i>	non-native	0	forb	perennial	red clover
<i>Trifolium repens</i>	non-native	0	forb	perennial	white clover
<i>Triticum aestivum</i>	non-native	0	grass	annual	wheat
<i>Typha angustifolia</i>	non-native	0	forb	perennial	narrow-leaved cattail
<i>Valerianella radiata</i>	native	1	forb	annual	corn salad
<i>Verbascum thapsus</i>	non-native	0	forb	biennial	woolly mullein
<i>Verbena hastata</i>	native	3	forb	perennial	blue vervain
<i>Verbena urticifolia</i>	native	3	forb	perennial	white vervain

<i>Vernonia missurica</i>	native	5	forb	perennial	missouri ironweed
<i>Veronica arvensis</i>	non-native	0	forb	annual	corn speedwell
<i>Veronica peregrina</i>	native	0	forb	annual	purslane speedwell
<i>Vicia dasycarpa</i>	non-native	0	forb	annual	woolly-pod vetch
<i>Viola rafinesquii</i>	non-native	0	forb	annual	wild pansy
<i>Xanthium strumarium</i>	native	0	forb	annual	cocklebur

Table 2. Plant species found during the spring and summer survey

Species	Spring	Summer
<i>Acalypha gracilens</i>		x
<i>Acalypha virginica</i>		x
<i>Acer negundo</i>	x	
<i>Achillea millefolium</i>	x	x
<i>Agrimonia parviflora</i>	x	x
<i>Agropyron repens</i>		x
<i>Agrostis alba</i>		x
<i>Alisma plantago-aquatica v. parviflorum</i>	x	
<i>Allium vineale</i>	x	x
<i>Ambrosia artemisiifolia</i>		x
<i>Ambrosia trifida</i>	x	x
<i>Ammannia coccinea</i>		x
<i>Andropogon gerardii</i>	x	x
<i>Andropogon virginicus</i>	x	
<i>Apocynum cannabinum</i>	x	x
<i>Arabidopsis thaliana</i>	x	
<i>Arenaria serpyllifolia</i>	x	
<i>Asclepias hirtella</i>		x
<i>Asclepias incarnata</i>		x
<i>Asclepias syriaca</i>	x	x
<i>Aster lateriflorus</i>	x	
<i>Aster pilosus</i>		x
<i>Barbarea vulgaris</i>	x	x
<i>Bidens aristosa v. retrorsa</i>		x
<i>Bidens connata</i>		x
<i>Bidens vulgata</i>		x
<i>Boehmeria cylindrica</i>	x	x
<i>Bouteloua curtipendula</i>		x
<i>Bromus arvensis</i>		x
<i>Bromus inermis</i>	x	x
<i>Campsis radicans</i>		x
<i>Capsella bursa-pastoris</i>	x	
<i>Cardamine hirsuta</i>	x	
<i>Carduus nutans</i>		x
<i>Carex aureolensis</i>		x
<i>Carex blanda</i>		x
<i>Carex festucacea</i>		x
<i>Carex frankii</i>		x
<i>Carex glaucoidea</i>	x	
<i>Carex hirsutella</i>		x

<i>Carex mesochorea</i>		x
<i>Carex squarrosa</i>		x
<i>Carex tribuloides</i>		x
<i>Carex vulpinoidea</i>		x
<i>Cassia fasciculata</i>		x
<i>Cassia marilandica</i>		x
<i>Celtis occidentalis</i>	x	x
<i>Cerastium dubium</i>	x	
<i>Chamaesyce nutans</i>		x
<i>Chamaesyce supina</i>		x
<i>Cirsium discolor</i>	x	x
<i>Cirsium vulgare</i>	x	x
<i>Conium maculatum</i>	x	
<i>Conyza canadensis</i>	x	x
<i>Cornus drummondii</i>	x	
<i>Corydalis flavula</i>	x	
<i>Croton capitatus</i>		x
<i>Croton monanthogynus</i>		x
<i>Cynanchum laeve</i>		x
<i>Cyperus esculentus</i>		x
<i>Cyperus ovularis</i>		x
<i>Cyperus strigosus</i>		x
<i>Dactylis glomerata</i>		x
<i>Daucus carota</i>	x	x
<i>Desmanthus illinoensis</i>		x
<i>Digitaria sanguinalis</i>	x	
<i>Diospyros virginiana</i>		x
<i>Dipsacus laciniatus</i>	x	
<i>Dipsacus sylvestris</i>	x	x
<i>Draba brachycarpa</i>	x	
<i>Echinochloa crusgalli</i>		x
<i>Echinochloa muricata</i>		x
<i>Elaeagnus umbellata</i>	x	x
<i>Eleocharis elliptica v. compressa</i>		x
<i>Eleocharis obtusa</i>		x
<i>Eleocharis palustris</i>		x
<i>Eleusine indica</i>		x
<i>Elymus virginicus</i>	x	x
<i>Eragrostis minor</i>		x
<i>Eragrostis pectinacea</i>		x
<i>Eragrostis spectabilis</i>		x

<i>Erechtites hieracifolia</i>		x
<i>Erigeron annuus</i>		x
<i>Erigeron philadelphicus</i>	x	x
<i>Eriochloa contracta</i>		x
<i>Eupatorium altissimum</i>		x
<i>Eupatorium coelestinum</i>	x	x
<i>Eupatorium perfoliatum</i>		x
<i>Eupatorium serotinum</i>		x
<i>Euthamia graminifolia</i>		x
<i>Festuca pratensis</i>		x
<i>Galium aparine</i>	x	x
<i>Galium pedemontanum</i>	x	
<i>Gaura parviflora</i>		x
<i>Geranium carolinianum</i>	x	
<i>Gleditsia triacanthos</i>	x	x
<i>Gnaphalium obtusifolium</i>		x
<i>Helianthus annuus</i>	x	
<i>Hibiscus lasiocarpus</i>		x
<i>Holosteum umbellatum</i>	x	
<i>Hypericum punctatum</i>		x
<i>Ipomoea pandurata</i>		x
<i>Iva annua</i>		x
<i>Juncus acuminatus</i>		x
<i>Juncus biflorus</i>		x
<i>Juncus dudleyi</i>	x	x
<i>Juncus effusus v. solutus</i>	x	x
<i>Juncus tenuis</i>		x
<i>Juncus torreyi</i>		x
<i>Juniperus virginiana</i>	x	x
<i>Kummerowia striata</i>		x
<i>Lactuca canadensis</i>	x	x
<i>Lactuca saligna</i>		x
<i>Lactuca serriola</i>		x
<i>Lamium amplexicaule</i>	x	
<i>Leersia oryzoides</i>		x
<i>Lepidium virginicum</i>	x	x
<i>Lespedeza cuneata</i>	x	x
<i>Lonicera japonica</i>	x	x
<i>Lonicera maackii</i>	x	x
<i>Lotus corniculatus</i>	x	x
<i>Ludwigia palustris</i>		x
<i>Ludwigia peploides</i>		x
<i>Lycopus americanus</i>		x

<i>Medicago lupulina</i>	x	
<i>Medicago sativa</i>	x	
<i>Melilotus alba</i>		x
<i>Melilotus officinalis</i>		x
<i>Mimulus alatus</i>		x
<i>Morus alba</i>		x
<i>Morus rubra</i>		x
<i>Muhlenbergia schreberi</i>	x	
<i>Oenothera biennis</i>	x	
<i>Oxalis stricta</i>	x	x
<i>Panicum capillare</i>	x	
<i>Panicum philadelphicum</i>		x
<i>Panicum virgatum</i>	x	x
<i>Paspalum laeve</i>		x
<i>Paspalum pubiflorum v. glabrum</i>		x
<i>Passiflora incarnata</i>		x
<i>Phalaris arundinacea</i>		x
<i>Phleum pratense</i>		x
<i>Phragmites australis</i>	x	x
<i>Phyla lanceolata</i>		x
<i>Physalis longifolia</i>		x
<i>Phytolacca americana</i>	x	x
<i>Plantago aristata</i>		x
<i>Plantago lanceolata</i>	x	x
<i>Plantago major</i>		x
<i>Platanus occidentalis</i>	x	
<i>Poa compressa</i>		x
<i>Poa pratensis</i>	x	
<i>Polygonum coccinea</i>		x
<i>Polygonum hydropiperoides</i>		x
<i>Polygonum persicaria</i>		x
<i>Polygonum punctatum</i>		x
<i>Populus deltoides</i>	x	x
<i>Portulaca oleracea</i>		x
<i>Potentilla simplex</i>	x	x
<i>Pycnanthemum tenuifolium</i>	x	x
<i>Pyrrhoppappus carolinianus</i>		x
<i>Quercus palustris</i>	x	
<i>Ranunculus abortivus</i>	x	
<i>Rhus copallina</i>	x	
<i>Rhus glabra</i>	x	
<i>Robinia pseudo-acacia</i>		x

<i>Rosa multiflora</i>	x	x
<i>Rubus allegheniensis</i>	x	x
<i>Rudbeckia hirta</i>		x
<i>Rumex crispus</i>		x
<i>Rumex verticillatus</i>	x	
<i>Salix nigra</i>	x	x
<i>Schizachyrium scoparium</i>	x	x
<i>Scirpus georgianus</i>		x
<i>Setaria faberi</i>		x
<i>Setaria glauca</i>	x	x
<i>Sida spinosa</i>		x
<i>Solanum carolinense</i>		x
<i>Solidago canadensis</i>	x	x
<i>Sonchus arvensis</i>	x	
<i>Sorghastrum nutans</i>	x	x
<i>Sorghum halepense</i>		x
<i>Sporobolus asper</i>	x	
<i>Stellaria pallida</i>	x	
<i>Strophostyles leiosperma</i>		x
<i>Taraxacum officinale</i>	x	

<i>Teucrium canadense</i>		x
<i>Thlaspi arvense</i>	x	
<i>Torilis arvensis</i>		x
<i>Toxicodendron radicans</i>		x
<i>Tridens flavus</i>	x	x
<i>Trifolium hybridum</i>		x
<i>Trifolium pratense</i>		x
<i>Trifolium repens</i>	x	x
<i>Triticum aestivum</i>	x	
<i>Typha angustifolia</i>	x	x
<i>Valerianella radiata</i>	x	
<i>Verbascum thapsus</i>	x	x
<i>Verbena hastata</i>	x	x
<i>Verbena urticifolia</i>		x
<i>Vernonia missurica</i>	x	x
<i>Veronica arvensis</i>	x	
<i>Veronica peregrina</i>	x	
<i>Vicia dasycarpa</i>	x	
<i>Viola rafinesquii</i>	x	
<i>Xanthium strumarium</i>	x	

Table 3. *Elymus virginicus* locations found during the summer surveys (WGS 1984).

Species	Date	Point_X	Point_Y
<i>Elymus virginicus</i>	8/12/2019	-89.5231	38.01874
<i>Elymus virginicus</i>	8/12/2019	-89.5225	38.01832
<i>Elymus virginicus</i>	8/12/2019	-89.4580	38.04152
<i>Elymus virginicus</i>	8/12/2019	-89.4696	38.03608
<i>Elymus virginicus</i>	8/12/2019	-89.5233	38.01795
<i>Elymus virginicus</i>	8/12/2019	-89.5236	38.01780
<i>Elymus virginicus</i>	8/12/2019	-89.4578	38.04142
<i>Elymus virginicus</i>	8/12/2019	-89.4577	38.04138
<i>Elymus virginicus</i>	8/13/2019	-89.4661	38.03873
<i>Elymus virginicus</i>	8/13/2019	-89.4669	38.03877
<i>Elymus virginicus</i>	8/13/2019	-89.4671	38.03877
<i>Elymus virginicus</i>	8/13/2019	-89.4674	38.03873
<i>Elymus virginicus</i>	8/13/2019	-89.4682	38.03864
<i>Elymus virginicus</i>	8/13/2019	-89.4697	38.03823
<i>Elymus virginicus</i>	8/13/2019	-89.4701	38.03795
<i>Elymus virginicus</i>	8/13/2019	-89.4704	38.03786
<i>Elymus virginicus</i>	8/13/2019	-89.4709	38.03759
<i>Elymus virginicus</i>	8/13/2019	-89.4709	38.03867
<i>Elymus virginicus</i>	8/13/2019	-89.4665	38.03876
<i>Elymus virginicus</i>	8/13/2019	-89.4685	38.03892

Figure 1. Field 1 at Pyramid State Park.

Fields at Pyramid State Park

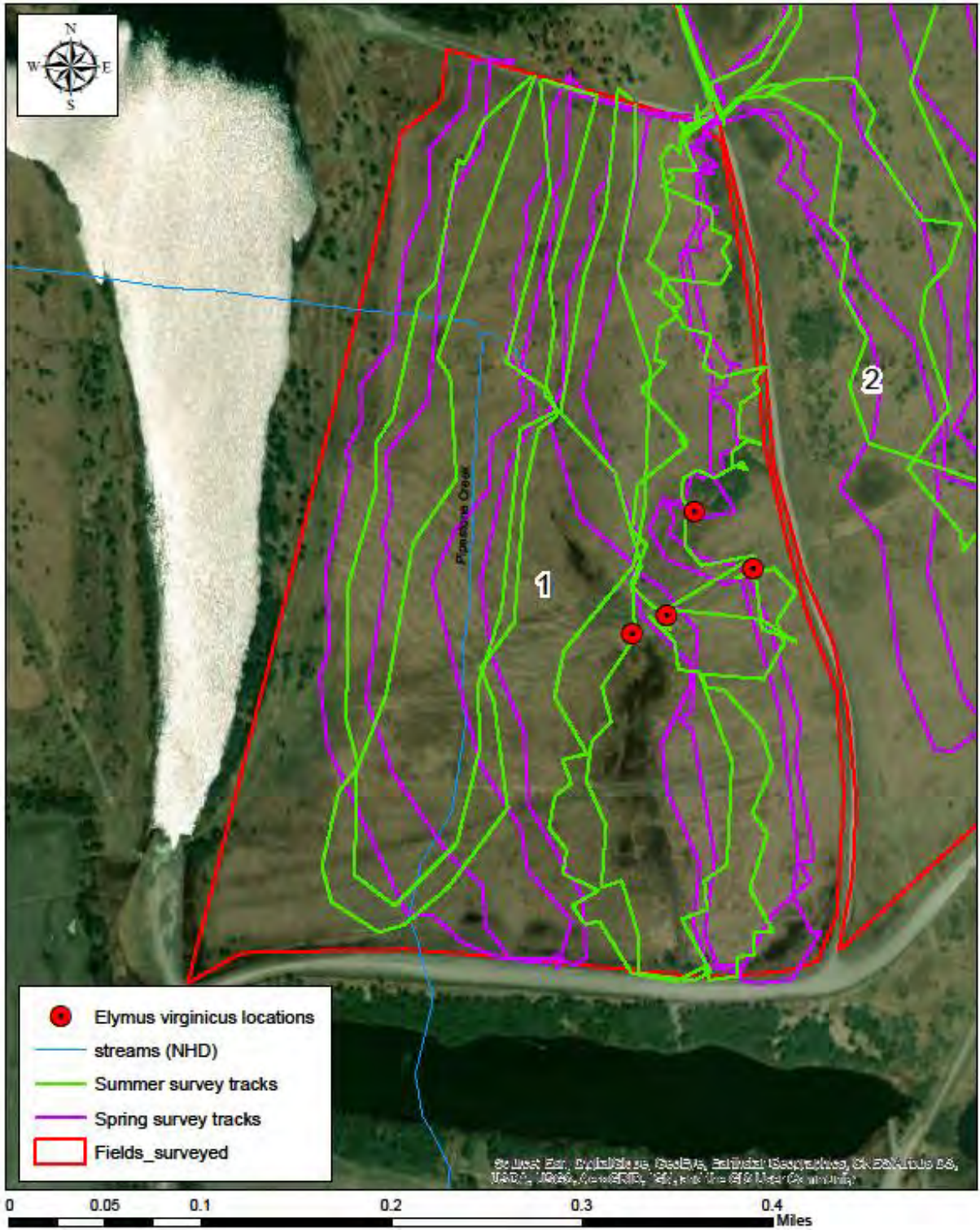


Figure 2. Field 2 at Pyramid State Park.

Fields at Pyramid State Park

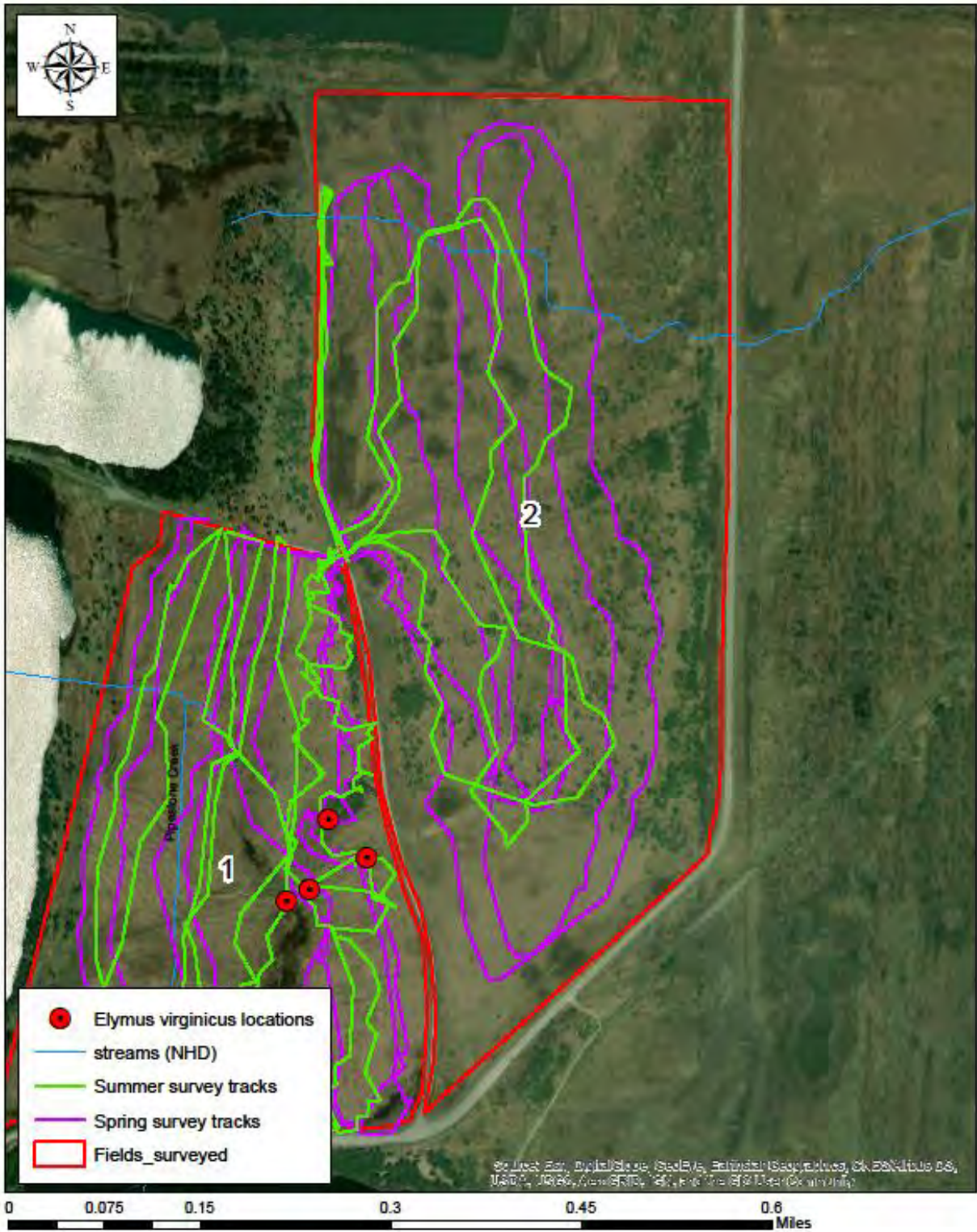


Figure 3. Field 3 at Pyramid State Park.

Fields at Pyramid State Park

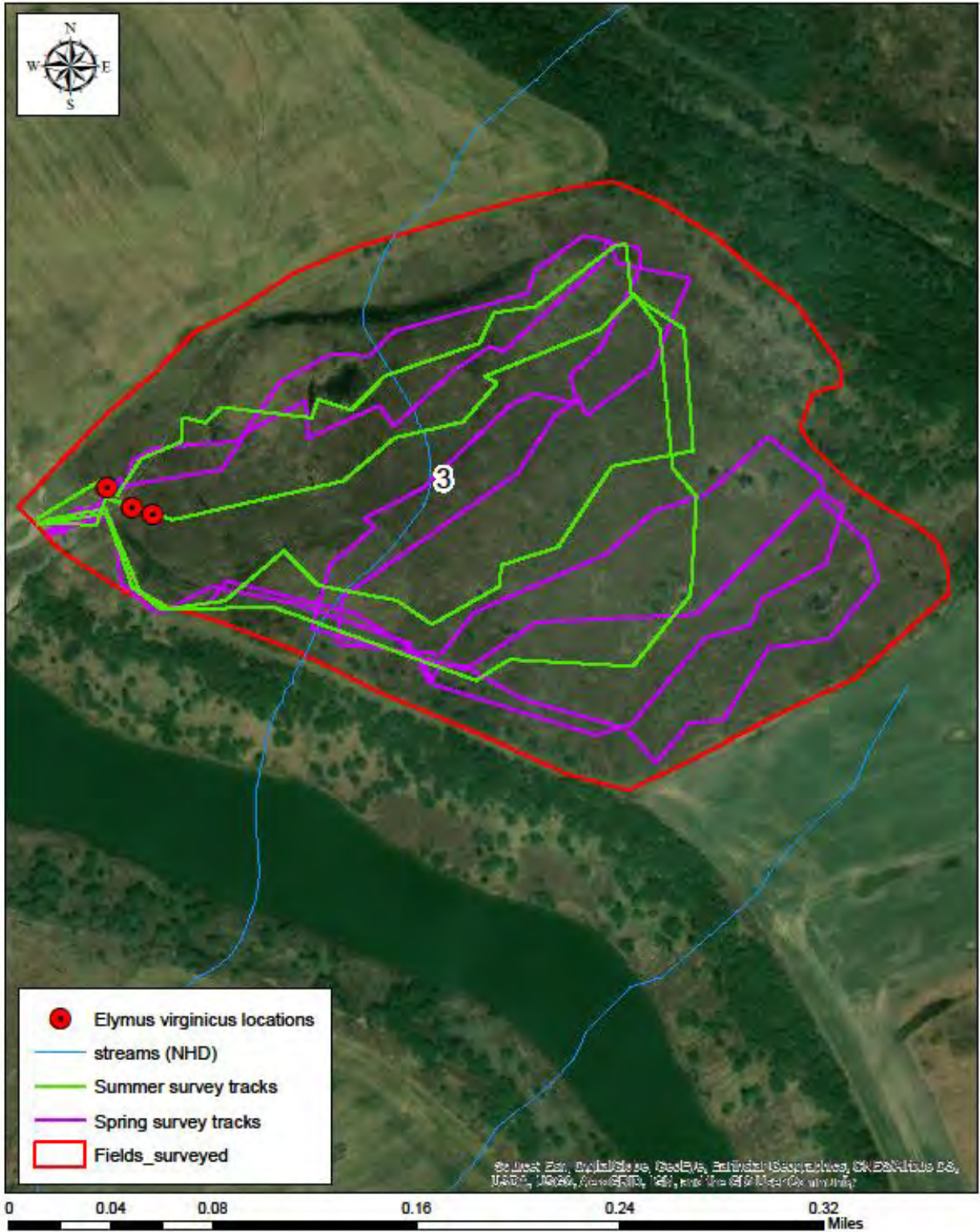


Figure 4. Field 4 at Pyramid State Park.

Fields at Pyramid State Park

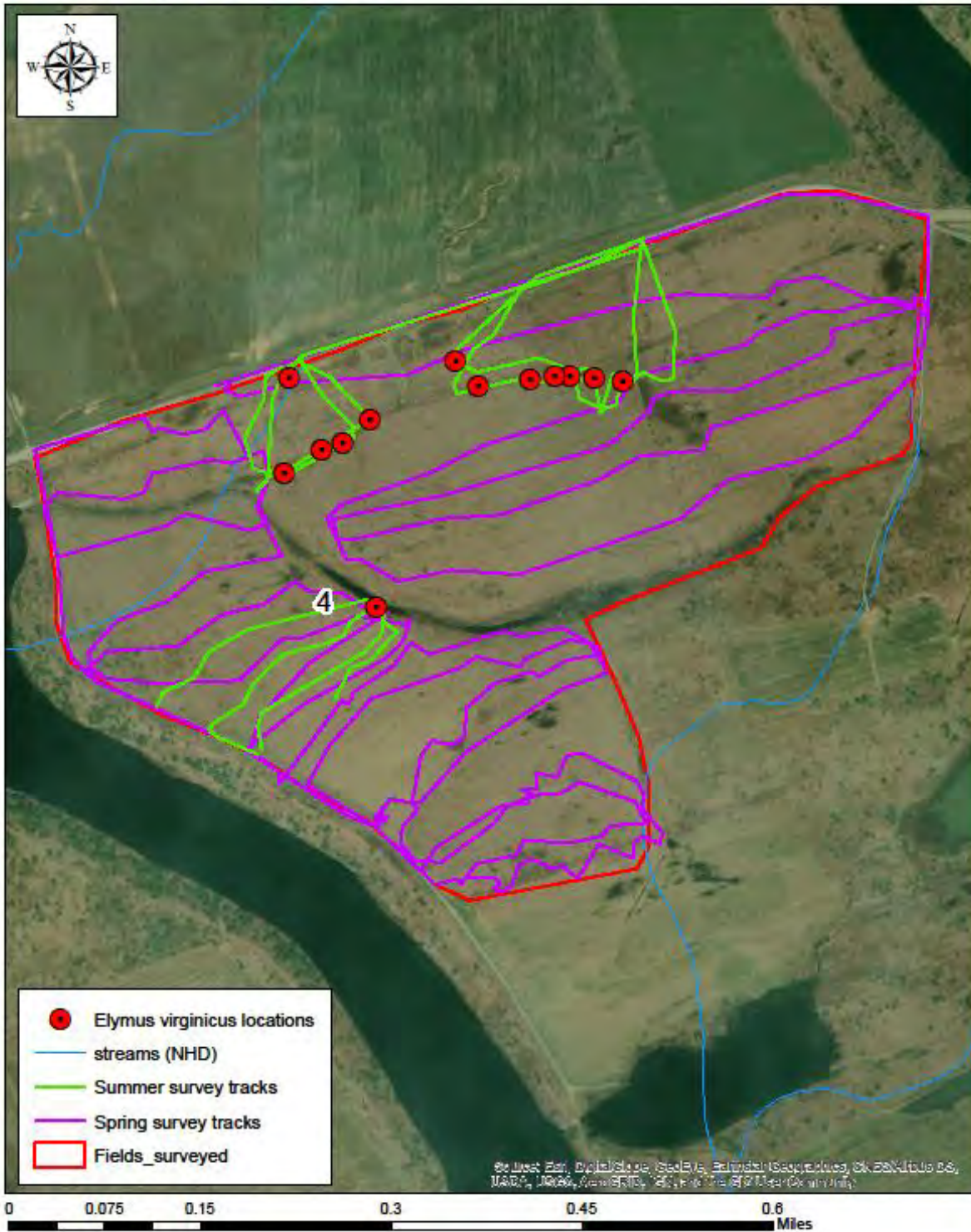


Figure 5. Field 5 at Pyramid State Park.

Fields at Pyramid State Park



Grassland Monitoring Team Quality and Invasive Indicators

Tier 1



Tallgrass Prairie of Western Minnesota, North Dakota, and South Dakota

Updated by Grassland Monitoring GLOBE intern Erin Medvecz, August 4, 2014

Sources

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Notes

- This field guide is intended as a reference to grasp a basic understanding of plant identification of the species associated with Tier 1 of the Grassland Monitoring Team monitoring protocol for The Nature Conservancy, the Minnesota Department of Resources, and the U.S. Fish and Wildlife Service.
- The double leaf symbol in the upper left hand corner indicates that that plant is a "look-alike." Refer to the last section of the packet for extra help distinguishing these species from others that look similar.
- The TNC location section on each page is where I, Erin Medvecz, saw that given plant throughout the course of the summer of 2014. OGL is Ordway Glacial Lakes, ABR is Agassiz Beach Ridges, and BR is Brown Ranch. Where TNC locations is blank, the plant was not seen in the summer of 2014. It is left blank so that others can fill in where they find the species.
- Plant identification information was compiled from several sources, cited on the following page in MLA citation format.
- All photos without captions were taken by Erin Medvecz.
- All other photographs were found on the Ladybird Johnson Wildflower Center website, the Minnesota Wildflowers website, Invasives.org, the USDA plant database, or the Forestry Images website. These photographs may be used for noncommercial educational purposes (such as this), and are cited accordingly throughout the packet. MLA citations for the websites can be found on the following page.

Grassland Monitoring Team Quality Indicators

Tier 1



Tallgrass Prairie of Western Minnesota, North Dakota, and South Dakota

Updated by Grassland Monitoring GLOBE intern Erin Medvecz, August 1, 2014



Leadplant
Amorpha canescens

- *Shrub
- *Leaves. Gray-green; fuzzy
- *Stem. Woody
- *Flower. Purple; arranged in vertical clusters
- *Soil. Sandy; loamy
- *Moisture. Dry to medium
- *Blooms. June-August
- *TNC Locations. OGL, ABR, BR



Cluster of flowers before blooming



Compound leaves



Flowers in bloom



Ground Plum
Astragalus crassicaarpus

- *Forb
- *Leaves. Alternate; compound; leaflets paired oppositely
- *Stems. Hairy; short
- *Flowers. Purple; arranged in a circular cluster around a central point
- *Fruit. Plums about the size of a cherry; green to purple
- *Soil. Sandy; loamy
- *Moisture. Dry to medium
- *Blooms. May-June
- *TNC Locations. OGL, ABR



Johnson, Johnny L. (Lady Bird Johnson Wildflower Center)



Johnson, Johnny L. (Lady Bird Johnson Wildflower Center)



Plums found near base of plant



Prairie Turnip
Pedimelum esculentum

- *Forb
- *Leaves. Arranged palmately (shaped like the palm of your hand); each leaf divided into 5 parts; hairy
- *Stems. Covered in long, white hairs
- *Flowers. Blue to purple; arranged in a cone-shaped spike
- *Soil. Sandy
- *Moisture. Dry
- *Blooms. May-July
- *TNC Locations. OGL, ABR



Cluster of flowers



Palmate-shaped leaf arrangement



Hairy stem



Entire plant



Pasqueflower
Anemone patens

- *Forb
- *Leaves. Dissected several times; low to the ground; often grow in clumps
- *Stem. Flower stem is hairy; leaf stem is smooth
- *Flower. Blue, purple, or white; 5-7 petals; hairy; develop, bloom, and die before leaves appear
- *Moisture. Dry to medium
- *Blooms. March-May
- *TNC Locations. OGL, ABR



Flowers appear before leaves



Wide, dissected leaf



Clumps of leaves



Golden Alexanders

Zizia aurea

- *Forb
- *Leaves: Smooth; 3-parted; toothed leaflets
- *Stems: Smooth
- *Flowers: Yellow; arranged in small clusters that are then arranged in a flat-topped cluster
- *Soil: Sandy; loamy
- *Moisture: Medium to wet
- *Blooms: May-July
- *TNC Locations: OGL, ABR



Flat-topped cluster of flowers



Basal leaves



Entire plant



Leaf arrangement



Heart-Leaved Alexanders

Zizia aptera

- *Forb
- *Leaves: Basal leaves-individual and heart shaped; red dot where leaf joins petiole; toothed; Upper leaves-3-parted; vary in shape from heart to more triangular
- *Stems: Smooth
- *Flowers: Yellow; arranged in small clusters that are then arranged in a flat-topped cluster
- *Moisture: Medium to wet
- *Blooms: April-June
- *TNC Locations: OGL, ABR



Flat-topped cluster of flowers



Basal leaves



Upper leaves, heart-shaped



Upper leaves, pointed tips



Entire plant

Bird's Foot Coreopsis

Coreopsis palmata

- *Forb
- *Leaves: Opposite; divided into 3-5 lobes; shaped like a bird's foot
- *Stems: Smooth
- *Flowers: Yellow
- *Soil: Sandy; loamy
- *Moisture: Dry to medium
- *Blooms: June-August
- *TNC Locations: OGL



Five-lobed leaf



Three-lobed leaf



Opposite leaf attachment

Narrow-Leaved Purple Coneflower

Echinacea angustifolia

- *Forb
- *Leaves: Basal; prominent veination; roughly hairy
- *Stems: Red-green; roughly hairy
- *Flower: Purple; downward-bent petals surrounding a seed head
- *Soil: Sandy; loamy
- *Moisture: Dry to medium
- *Blooms: June-July
- *TNC Locations: OGL, ABR, BR



Flower bud



Roughly hairy stem



Can be identified from last year's stalks



Roughly hairy leaf



White Prairie Clover

Dalea candida

- *Forb
- *Leaves. Compound; odd number of leaflets; wide leaflets
- *Stems. Smooth
- *Flower. White; arranged in a spike that blooms from the bottom up
- *Soil. Sandy; loamy
- *Moisture. Dry to medium
- *Blooms. June–August
- *TNC Locations. OGL, ABR, BR



Entire plant



Leaf attachment



Wide leaflets



Leaf attachment



Purple Prairie Clover

Dalea purpurea

- *Forb
- *Leaves. Compound; odd number of leaflets; very narrow leaflets
- *Stems. Smooth; thin
- *Flower. Purple; arranged in a spike that blooms from the bottom up
- *Soil. Sandy; loamy
- *Moisture. Dry to medium
- *Blooms. June–August
- *TNC Locations. OGL, ABR, BR



Entire plant



Flower bud



Thin leaflets



Leaf arrangement



Northern Plains Blazing Star

Liatris ligulistylis

- *Forb
- *Leaves. Up to 1 ½ inch wide; can have short white hairs
- *Stems. Smooth to hairy; reddish
- *Flowers. Pink; 3–10 heads or clusters of many star-shaped flowers; looser clusters; long stalks holding up flowers; floral bracts are flat and rounded on tips
- *Soil. Sandy; loamy
- *Moisture. Medium to wet
- *Blooms. July–September
- *TNC Locations. ABR



Bengston, Bennie (Lady Bird Johnson Wildflower Center)



MinnesotaWildflowers.com



Long stalks

MinnesotaWildflowers.com



Dotted Blazing Star

Liatris punctata

- *Forb
- *Leaves. Translucent dots or pits visible on underside; mostly smooth; dark green; sparse hairs may be present on margins (leaf edges)
- *Stems. Smooth
- *Flowers. Pink; arranged in dense clusters
- *Soil. Sandy; loamy
- *Moisture. Dry to medium
- *Blooms. July–September
- *TNC Locations. OGL, ABR, BR



Thin, dark green leaves



Buds before blooming



Flowers in bloom



Dots are visible



Rough Blazing Star

Liatris aspera

- *Forb
- *Leaves. Alternate; numerous; hairy; single vein down center; pointed tip;
- *Stems. Hairy; green-red
- *Flowers. Pink; many arranged in a head; at least 10 loosely arranged in a cluster-like spike; bracts are round with jagged edges that fold inward
- *Soil. Sandy; loamy
- *Moisture. Dry to medium
- *Blooms. August–October
- *Locations. OGL, ABR, BR



Flower clusters held close to stem

Roughly hairy leaves



Jagged-edged bracts



Great Blazing Star

Liatris pycnostachya

- *Forb
- *Leaves. Alternate; linear; erect, upward growing
- *Stems. Hairy
- *Flowers. Pink; arranged in a dense, full spike
- *Soil. Sandy; loamy
- *Moisture. Medium to wet
- *Blooms. July–September
- *TNC Locations. OGL, ABR, BR



Star-shaped flowers

In bloom



Spike before blooming

Hairy stem and upward growing linear leaves



Hairy leaves

Silky Aster

Symphotrichum sericeum

- *Forb
- *Leaves. Pale or silvery green; entire; fine hairs give it a silky feel
- *Stems. Smooth
- *Flowers. Purple; 15–25 petals
- *Soil. Sandy; loamy
- *Moisture. Dry
- *Blooms. August–October
- *TNC Locations. OGL, ABR, BR



Stone, Robert L. (Lady Bird Johnson Wildflower Center)



Group of plants growing near each other



Very silky leafy



Tall Cinquefoil

Potentilla arguta

- *Forb
- *Leaves. Compound; odd number of leaflets; hairy; most are basal
- *Stems. Hairy
- *Flowers. White with yellow center; 5 petals; flowers arranged in a cluster
- *Soil. Rocky
- *Moisture. Dry to medium
- *Blooms. June–July
- *TNC Locations. OGL, ABR, BR



Hairy stem



Compound leaf



Flowers arranged in clusters



Entire plant

Alum Root

Heuchera richardsonii

- *Forb
- *Leaves. Basal; long petioles; palmate; 7-9 lobes each with 3-5 rounded edges
- *Stems. Hairy
- *Flowers. Green to reddish; very small; arranged in clusters
- *Soil. Sandy
- *Moisture. Dry to wet
- *Blooms. June-July
- *TNC Locations. OGL, ABR



Palmate-shaped leaf

Wood Lily

Lilium philadelphicum

- *Forb
- *Leaves. Groups of 4-7 around upper stem
- *Stems. Smooth
- *Flowers. Orange to red; purple dots; 6 petals that do not touch in center; can be multiple flowers in a cluster or just one
- *Soil. Sandy
- *Moisture. Dry
- *Blooms. June-August
- *TNC Locations. ABR



Whorl of leaves around stem



Entire plant

Toothed Evening Primrose

Calylophus serrulatus

- *Forb
- *Leaves. Narrow; linear; toothed; can be creased along central vein
- *Stems. Clustered
- *Flowers. Yellow; four petals
- *Soil. Rocky; sandy
- *Moisture. Dry
- *Blooms. June-July
- *TNC Locations. OGL, ABR, BR



Serrated leaf edges



Prairie Phlox

Phlox pilosa

- *Forb
- *Leaves. Opposite; each pair alternates between facing north-south and east-west; sharply pointed
- *Stems. Hairy
- *Flowers. Pink to purple; five petals; arranged in a loose cluster
- *Soil. Rocky; sandy
- *Moisture. Dry
- *Blooms. April-June
- *TNC Locations. OGL



Entire plant



Opposite leaf pairs

Smooth Rattlesnake Root

Prenanthes racemosa

*Forb

*Leaves. Smooth; waxy; wavy margins (leaf edges) in between smooth and toothed; upper clasp stem

*Stems. Smooth; have milky juice

*Flowers. Pink to white; arranged in dense, long, and narrow clusters

*Moisture. Dry to wet

*Blooms. August–September

*TNC Locations.



Smith, R.W. (Lady Bird Johnson Wildflower Center)



Smith, R.W. (Lady Bird Johnson Wildflower Center)



Wasowski, Sally and Andy (Lady Bird Johnson Wildflower Center)

Bracted Spiderwort

Tradescantia bracteata

*Forb

*Leaves. Sides folded upwards; long and thin;

*Stems. Unbranched

*Flowers. Blue, purple, or even pink; 3 petals; usually only one to a few in the loose cluster bloom at once

*Soil. Sandy; loamy

*Moisture. Dry to medium

*Blooms. April–July

*TNC Locations. OGL, ABR, BR



Leaves are thin and folded



Cluster of buds



Entire plant

White Camas

Zigadenus elegans

*Forb

*Leaves. Basal; thin, resembling wide blades of grass

*Stems. Smooth

*Flowers. White petals with yellow spots forming a circle in the center of the flower; flowers held out from stem on stalks; arranged in a loose cluster

*Soil. Limy; sandy

*Moisture. Dry to medium

*Blooms. July–August

*TNC Locations. ABR



Entire plant



Leaves are grass-like and hard to distinguish alone



Prairie Loosestrife

Lysimachia quadriflora

*Forb

*Leaves. Opposite; linear; no petiole; smooth

*Stems. Smooth; square

*Flowers. Yellow; 5 petals; arranged in clusters; hang upside down; supported by long stalks

*Moisture. Medium to wet

*Blooms. July–August

*TNC Locations. ABR, BR



Flower with 5 petals



Flowers droop and hang upside down



Opposite leaves



Linear leaf



Entire plant

Grassland Monitoring Team Invasive Indicators

Tier 1



Tallgrass Prairie of Western Minnesota, North Dakota, and South Dakota

Updated by Grassland Monitoring GLOBE intern Erin Medvecz, August 1, 2014

Sneezeweed *Helenium autumnale*

- *Forb
- *Leaves. Alternate; numerous
- *Stems. Branched at top
- *Flowers. Many yellow petals that each have 3 lobes; petals surround a large yellow central disk; arranged in branched clusters
- *Soil. Sandy; loamy
- *Moisture. Medium to wet
- *Blooms. August–October
- *TNC Locations. BR



Flower disk before petals develop



Alternate leaves



Smith, R.W. (Lady Bird Johnson Wildflower Center)



Wasowski, Sally and Andy (Lady Bird Johnson Wildflower Center)



Entire plant



Kentucky Bluegrass *Poa pratensis*

- *Grass
- *Leaves. Boat-shaped leaf tip; smooth; "railroad track" pattern of dots along mid-vein of leaf
- *Stems. Thin; round
- *Seed head. Green and then tan
- *Cool Season
- *Sod former
- *TNC Locations. OGL, ABR, BR



Boat-shaped leaf tip



Joseph M. DiTomaso, University of California - Davis, Bugwood.org



Railroad-track pattern



Late in the season



Dead stalks from this season



Canada Bluegrass *Poa compressa*

- *Grass
- *Leaves. Blue-green; boat-shaped leaf tip
- *Stems. Flat; do not roll between your fingers
- *Moisture. Dry
- *Cool Season
- *Grows in clumps
- *TNC Locations. OGL, ABR



Short leaves along stalk



Flowering seed heads



Flowering seed heads



Redtop

Agrostis gigantea / stolonifera

- *Grass
- *Leaves. Pale green; short; tall ligule
- *Seed head. Large with many branches; red-purple; shiny-looking
- *Cool season
- *Sod former
- *TNC Locations: ABR, BR



Leaf attachment and ligule



Before inflorescences branch out

Tall ligule



Reed Canary Grass

Phalaris arundinacea

- *Grass
- *Leaves. Tall ligule; wide; spread outward; when mature, can have a crimp like Smooth Brome
- *Seed head. Yellow, can be pink-purple when spread out
- *Moisture. Wet
- *Cool season
- *Grows in clumps or monocultures
- *TNC Locations: OGI, ABR, BR



Seed head



Ligule present



Crimp may be present



Smooth Brome

Bromus inermis

- *Grass
- *Leaves. Has an "M" shaped crimp; smooth
- *Sheath. Comes to a "V"
- *Seed head. Bronze hue
- *Cool Season
- *Sod former
- *TNC Locations: OGI, ABR, BR



No ligule present



"V" sheath



Very defined "M" shaped crimp



Seed head

Annual Bromes

Bromus japonicus

Bromus tectorum

Bromus secalinus

- *Grass
- *Seed heads. Droopy; bent over as if weighed down
- *TNC Locations: BR

B. secalinus



USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. 3 vols. Charles Scribner's Sons, New York. Vol. 1: 278.

B. tectorum



Steve Dewey, Utah State University, Bugwood.org

B. japonicus



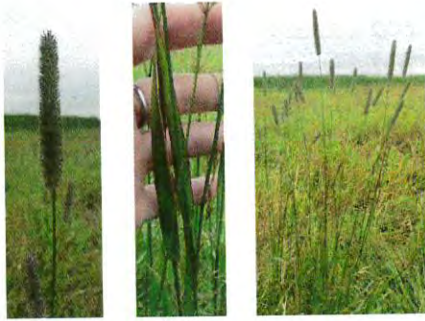
Robert H. Mohlenbrack, hosted by the USDA-NRCS PLANTS Database / USDA NRCS. 1995. *Northeast wetland flora: Field office guide to plant species*. Northeast National Technical Center, Chester.



Patrick J. Alexander, hosted by the USDA-NRCS PLANTS Database

Timothy *Phleum pratense*

- *Grass
- *Leaves: Short; light green; veins visible; flat; ligule present
- *Seed head: Dense spike; green and then tan
- *Moisture: Dry to medium
- *Cool season
- *Clumps or sod forming
- *TNC Locations: OGL, ABR, BR



Leaves



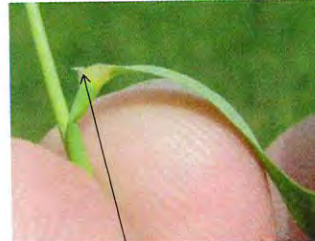
Ligule present

Seed heads



Quackgrass *Elytrigia repens*

- *Grass
- *Leaves: Clasp stem; can be hairy; no ligule; usually wider than 6 mm
- *Seed head: Spikelets are three times as long as internodes (space between the sites of spikelet attachment)
- *Collar: Has auricles (arms surrounding stem)
- *Cool season
- *Sod former
- *TNC Locations: OGL, ABR, BR



Auricles, "arms", present



Auricles wrap around stem



Seed head



Crested Wheatgrass *Agropyron cristatum*

- *Grass
- *Leaves: Smooth or hairy; open sheaths; short
- *Seed head: Flattened and wide; very small internodes
- *Collar: Has auricles (arms surrounding stem)
- *Cool season
- *Grows in clumps
- *TNC Locations:



Short leaf



Wide, flattened seed head



Bird's-Foot Trefoil *Lotus corniculatus*

- *Forb
- *Leaves: 5 parted; there are 3 center leaflets with 2 smaller ones found on either side of main cluster
- *Stems: Many stems grow in a whorled cluster
- *Flowers: Yellow; arranged in clusters of 4-8 flowers
- *Soil: Disturbed
- *Blooms: June-August
- *TNC Locations: OGL



Cluster of flowers



3 center leaflets



Stems all arise from a central point

Spotted Knapweed
Centaurea stoebe

- *Forb
- *Leaves. Narrowly lobed
- *Stems. Branched
- *Flowers. Pink to purple; bracts have black tips
- *Soil. Limy
- *Moisture. Dry
- *Blooms. June–October
- *TNC Locations.



Branched stem



Queen Anne's Lace
Daucus carota

- *Forb
- *Leaves. Feathery; carrot-like
- *Stems. Hairy
- *Flowers. White; arranged in large, flat-topped clusters
- *Soil. Disturbed
- *Moisture. Dry
- *Blooms. June–September
- *TNC Locations. OGL



Carrot-looking leaf



Before blooming



Before blooming



Flat-topped flower cluster

Absinthe Sagewort
Artemisia absinthium

- *Forb
- *Leaves. Alternate; gray-green; divided several times; rounded tips; smells like sage
- *Stems. Stalked
- *Flowers. Numerous; pale yellow; head droop downwards
- *Soil. Disturbed
- *Moisture. Dry
- *Blooms. August–September
- *TNC Locations. ABR, BR



Individual leaf



Entire plant



Inconspicuous flowers



Leaves



Crown Vetch
Coronilla varia

- *Forb
- *Leaves. Compound; odd number of leaflets
- *Flowers. Pink to white; 5 parts; arranged in a circular cluster
- *Soil. Disturbed
- *Blooms. May–September
- *TNC Locations.



Forms thick patches



Compound leaves



Flower buds



Cluster of flowers

Ox-Eye Daisy

Leucanthemum vulgare

- *Forb
- *Leaves. Alternate; upper, stalkless, toothed; lower, long stalked, lobed or toothed
- *Stems. Hairy
- *Flowers. White petals surrounding a yellow disk
- *Moisture. Dry
- *Blooms. June–August
- *TNC Locations.



Roughly hairy stem



Upper leaves



Basal leaf (left); upper leaf (right)



Parsnip

Pastinaca sativa

- *Forb
- *Leaves. Divided into 5–15 lobed leaflets
- *Stems. Flat and ridged
- *Flowers. Yellow; arranged in clusters that are arranged in a large, flat-topped cluster
- *Moisture. Medium to wet
- *Blooms. June–July
- *TNC Locations.



Flat-topped cluster of flowers



Leaf arrangement



Entire plant

Butter-and-Eggs

Linaria vulgaris

- *Forb
- *Leaves. Linear; pale green
- *Flowers. Yellow to orange; two-hued; spur at bottom of flower; arranged in a cluster
- *Soil. Sandy
- *Blooms. May–September
- *TNC Locations.



Entire plant



Two-toned flower with spur



Leafy stem



Many linear leaves

Leafy Spurge

Euphorbia esula

- *Forb
- *Leaves. Bluish-green; alternate; rounded tips
- *Stems. Milky sap; smooth
- *Flowers. Green to yellow; arranged in a cluster
- *Soil. Light
- *Moisture. Dry
- *Blooms. May–September
- *TNC Locations. ABR, BR



Inconspicuous flowers



Numerous leaves line entire stem



Entire plant



Sweet Clover

Melilotus officinalis / alba

- *Forb
- *Leaves. 3 parted; toothed all the way around each leaflet
- *Stems. Heavily branched
- *Flowers. White or yellow; arranged in long clusters
- *Moisture. Dry to medium
- *Blooms. May-September
- *TNC Locations. OGL, ABR, BR



Melilotus alba (White Sweet Clover)



Melilotus officinalis (Yellow Sweet Clover)



Entire plant



Leaves toothed along entire edge



Alfalfa

Medicago sativa

- *Forb
- *Leaves. 3 parted; toothed only on upper half
- *Stems. Smooth
- *Flowers. Purple; arranged in clusters
- *Soil. Disturbed
- *Moisture. Dry
- *Blooms. June-September
- *TNC Locations. OGL, BR



Leaves only toothed on top edge/tips



Entire plant



Flower cluster



White Clover

Trifolium repens

- *Forb
- *Leaves. Three parted; solid dark green; circular lobes
- *Stems. Flower stem separate from leaf stems
- *Flowers. White; dense, circular cluster
- *Soil. Disturbed
- *Blooms. May-September
- *TNC Locations. OGL, ABR, BR



Solid green leaflets



Red Clover

Trifolium pratense

- *Forb
- *Leaves. 3 parted; white triangle visible in center of leaf
- *Stems. Hairy; support both flowers and leaves on same stem
- *Flowers. Red to pink; circular cluster
- *Soil. Disturbed
- *Blooms. May-September
- *TNC Locations. OGL, ABR, BR



Light colored triangles present on leaflets



Entire plant



Alsike Clover
Trifolium hybridum

- Forb
- Leaves. 3 parted; light green; leaflets slightly pointed on ends
- Stems. Support both flower and leaves on same stem
- Flowers. White and turn pink with age; circular cluster
- Soil. Disturbed
- Blooms. May–September
- TNC Locations.



Leaflets not fully rounded



Canada Thistle
Cirsium arvense

- Forb
- Leaves. Lighter green to white on the underside; basal leaves are those that tend to be whiter
- Stems. Spiny
- Flowers. ½ inch wide; pink flowers; arranged with many heads in a cluster
- Soil. Disturbed
- Moisture. Dry
- Blooms. June–October
- TNC Locations. OGL, ABR, BR



Entire plant



Plumeless Thistle
Carduus acanthoides

- Forb
- Leaves. Deeply lobed; hairy underneath; spiny tips
- Stems. Very spiny-winged up entire stem
- Flowers. ½–1 inch wide; pink; spiny bracts; arranged with one head at end of branch
- Soil. Disturbed
- Moisture. Dry
- Blooms. July–October
- TNC Locations. OGL



Spiny floral bracts; spines on leaves



Bull Thistle
Cirsium vulgare

- Forb
- Leaves. Spiny; divided into lobed segments with teeth
- Stems. Spiny-winged; often have reddish “veins” or ribs visible
- Flowers. Up to 1 ½ inches wide; purple; bracts with spiny tips; arranged with several heads in a cluster
- Soil. Disturbed
- Moisture. Dry
- Blooms. June–October
- TNC Locations. BR



Entire plant



Spiny leaf; red veins on stem are visible



Leaves with long spines



Spiny tipped bracts



Todd Pfeiffer, Klamath County Weed Control, Bugwood.org



Todd Pfeiffer, Klamath County Weed Control, Bugwood.org



Gary L. Piper, Washington State University, Bugwood.org



Musk Thistle

Carduus nutans

- *Forb
- *Leaves. Lobed with a noticeable yellow or white spine on the end; not hairy
- *Stems. Spiny-winged, but not all the way up the stem; stems are smooth underneath the flower head
- *Flowers. Pink; up to 3 inches wide; nodding; not clustered; triangular-shaped bracts
- *Soil. Disturbed
- *Moisture. Dry
- *Blooms. July–October
- *TNC Locations.



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Luke T. Kok, Virginia Polytechnic Institute and State University, Bugwood.org



USDA APHIS PPQ Archive, USDA APHIS PPQ, Bugwood.org

Sow Thistle

Sonchus arvensis

- *Forb
- *Leaves. Upper: clasping; heart-shaped bottom; prickly edges; Lower: deeply lobed; prickly edges
- *Stems. Milky juice; tall
- *Flowers. Yellow; look like a dandelion
- *Soil. Disturbed
- *Moisture. Medium to wet
- *Blooms. July–October
- *TNC Locations. ABR, BR



Upper leaves clasp stem



Leaf arrangement



Entire plant

Black Locust

Robinia pseudo-acacia

- *Tree
- *Leaves. Compound; alternate, leaflets attached oppositely; untoothed margins (leaf edges); upper surface is dark green while lower is pale green; pairs of spines at base of leaves
- *Bark. Brown or gray
- *Flowers. White; arranged in a drooping cluster
- *Fruit. Pod-like; brown; flat; smooth
- *Soil. Loamy; nonacidic
- *Moisture. Dry to moist
- *TNC Locations.



Makin, Julie (Lady Bird Johnson Wildflower Center)



Flaigg, Norman G. (Lady Bird Johnson Wildflower Center)

Tartarian Honeysuckle

Lonicera tatarica

- *Shrub
- *Leaves. Simple; opposite; smooth margins (leaf edges); upper surface dark green while lower surface pale green
- *Bark. Brown to gray; rough
- *Flowers. White to pink; paired
- *Fruit. Orange to red; paired berries
- *Blooms. May to June
- *TNC Locations. OGL





Common Buckthorn *Rhamnus cathartica*

- *Tall shrub/small tree
- *Leaves. Simple; opposite; long petioles; rounded base; lateral veins curve towards base of leaf; about 3-5 leaf veins per leaf; upper surface dark green while lower pale green; toothed margins (leaf edges)
- *Bark. Dark gray; smooth when young; thorns on ends of branchlets
- *Fruit. Round, black fruit
- *Moisture. Dry to moist
- *TNC Locations. OGL



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Thorn



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Curved lateral veins



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Glossy Buckthorn *Frangula alnus*

- *Tall shrub/small tree
- *Leaves. Alternate; untoothed; shiny appearance; about 8-9 leaf veins per leaf
- *Bark. Gray-brown; some areas lighter in color
- *Fruit. Round; color changes from red to dark purple as ripens
- *Moisture. Wet
- *TNC Locations.



UCA1539670
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Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Siberian Elm *Ulmus pumila*

- *Tree
- *Leaves. Simple; alternate; elliptical shaped; toothed margins (leaf edges); upper surface dark green while lower pale green; can be smooth or rough
- *Bark. Gray
- *Soil. Sandy; loamy
- *TNC Locations. ABR, BR



Toothed leaf



American Elm *Ulmus americana*

- *Tree
- *Leaves. Simple; alternate; elliptical-shaped; uneven leaf base; serrated leaf margins (leaf edges); upper surface dark green while lower pale green; can be smooth or rough
- *Bark. Ashy gray
- *Soil. Deep, moist, calcareous loam
- *TNC Locations.



0390037
Tom DeGomez, University of Arizona, Bugwood.org



Small tree



Bark



Alternate leaf attachment



5471414
Karan A. Rawlins, University of Georgia, Bugwood.org



5471412
Karan A. Rawlins, University of Georgia, Bugwood.org

Cottonwood *Populus deltoides*

- *Tree
- *Leaves. Simple; alternate; heart-shaped; toothed; smooth; bright green upper surface with a paler lower surface
- *Bark. Gray or brown; coarse
- *TNC Locations. BR



Sapling stem



Sapling leaf



Toothed leaf edge



Sapling

Green Ash *Fraxinus pennsylvanica*

- *Tree
- *Leaves. Compound; opposite; lance to elliptical shaped; consist of 5-9 leaflets; toothed margins; upper surface dark green while lower surface pale green; leaves attached by a very short petiole (stalk)
- *Bark. Gray to brown
- *Soil. Sand; silt; clay; loam
- *Moisture. Moist
- *TNC Locations.



Paul Wray, Iowa State University, Bugwood.org



Paul Wray, Iowa State University, Bugwood.org



Tom DeGomez, University of Arizona, Bugwood.org



Robert Vidéki, Doronicum Kft., Bugwood.org

Boxelder *Acer negundo*

- *Tree
- *Leaves. Compound; opposite; comprised of 3-5 leaflets; upper surface dark green while lower pale green and hairy
- *Bark. Brown or brown and gray
- *Fruit. Helicopter seeds
- *TNC Locations.



Paul Wray, Iowa State University, Bugwood.org



Ohio State Weed Lab Archive, The Ohio State University, Bugwood.org



Robert Vidéki, Doronicum Kft., Bugwood.org

Russian Olive *Elaeagnus angustifolia*

- *Tree
- *Leaves. Simple; alternate; lance-shaped; smooth margins (leaf edges); upper surface dull green while lower surface greenish gray or silvery gray; both sides of leaves have silvery scales or hairs
- *Flowers. Upper surface yellow while lower surface silvery
- *Blooms. June-July
- *TNC Locations.



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



T. Davis Sydner, The Ohio State University, Bugwood.org



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Look-Alike Plants

When starting out with plant identification, many of these indicator species may look similar to each other and to other plants found on the prairie. Use this part of the field guide to help distinguish between commonly found prairie plants and the native and invasive indicators.



Ground Plum

- Non-woody
- Stems grow outward in a circle from a central point
- Darker green leaves
- Smooth leaves
- Circular cluster of pinkish flowers
- TNC Locations. OGL



Bransford, W.D. and Dolphina (Lady Bird Johnson Wildflower Center)

Leadplant

- Woody
- Shrub
- Grayish-green leaves
- Soft and fuzzy leaves
- Dense spike-like cluster of dark purple flowers
- TNC Locations. OGL, ABR, BR



Leadplant

- Woody
- Grayish-green leaves; leaves are compound and larger than Silky Prairie Clover
- Soft and fuzzy leaves; rounded leaflet tips
- Dense spike-like cluster of dark purple flowers; cluster grows vertically
- TNC Locations. OGL, ABR, BR



Leadplant

Silky Prairie Clover

- Non-woody; very soft and fuzzy red stems
- Grayish-green leaves; leaves are compound and very small
- Soft and fuzzy leaves; pointed leaflet tips
- Dense spike-like cluster of light purple flowers; very soft; cluster grows horizontally
- TNC Locations. BR



Silky Prairie Clover



Prairie Turnip

- Entire plant is hairy, especially the stalk
- Green leaves
- Flowers are arranged in circular clusters and are light purple
- TNC Locations. OGL, ABR



Silver Scurfpea

- Smooth stalk; not hairy
- Silver-colored leaves
- Flowers are very small, often paired, and dark purple
- TNC Locations. OGL, ABR



Pasqueflower

- Leaves are dissected many times and grow/curl more upright than violet, which has flattened leaves
- Leaves tend to grow in clumps
- Flowers not present; they bloom early in spring and then the leaves develop
- TNC Locations: OGL, ABR

Thimbleweed

- Lobes of leaves are much thicker and there are fewer leaf dissections than Pasqueflower
- Flower and/or bud often present and growing out of center of leaf
- TNC Locations: OGL, ABR, BR

Prairie Violet

- Leaves are dissected but each lobe lies flat rather than curling upward like Pasqueflower
- Flowers can be seen in early summer, but often leaves are seen by themselves
- TNC Locations: OGL, ABR, BR

Canada Anemone

- Lobes of leaves are thickest of these four species and toothed into thirds at the tips
- Flower and/or bud often present and growing out of center of leaf
- TNC Locations: OGL, ABR, BR

Pasqueflower



Prairie Violet



Thimbleweed



Canada Anemone



Golden Alexanders

- Basal leaves are arrow-shaped
- TNC Locations: OGL, ABR



Heart-Leaved Alexanders

- Basal leaves are heart-shaped
- TNC Locations: OGL, ABR, BR



Parsnip

- Leaves are thinner
- Leaves have large teeth that are not entirely around the leaflets
- Different leaf shape than other two species
- TNC Locations:



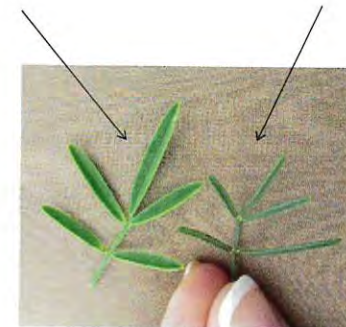
White Prairie Clover

- Leaves are more rounded
- Leaves are thicker
- Stem is thicker
- TNC Locations: OGL, ABR, BR



Purple Prairie Clover

- Leaves are very linear
- Very thin leaves
- Thin stem
- TNC Locations: OGL, ABR, BR



Rough Blazing Star

- Stems are roughly hairy and green to red
- Leaves are roughly hairy and have a pointed tip
- Flowers held close to stem
- Bracts are round with jagged edges that fold inward
- Grows in dry, sandy soils usually in more upland landscapes
- TNC Locations: OGL, ABR, BR

Dotted Blazing Star

- Leaves are a darker green color
- Leaves are very thin and have obvious "dots" or pits on the bottom of the leaf
- Leaves may have sparse hairs on margins (leaf edges)
- Grows in dry, sandy soils usually in more upland landscapes
- TNC Locations: OGL, ABR, BR

Northern Plains Blazing Star

- Stems are smooth or hairy
- Leaves are largest of these 4 species
- Leaves can have short white hairs
- Long stalks hold up flowers
- Bracts have rounded tips and are flat
- Grows in wetter areas
- TNC Locations:

Great Blazing Star

- Stems and leaves are roughly hairy
- Leaves are thin and lighter green
- Grows in wetter landscapes
- Has a dense spike of flowers—once the head starts developing it is easy to distinguish this species
- TNC Locations: OGL, ABR, BR

Rough Blazing Star



Northern Plains Blazing Star



Dotted Blazing Star



Great Blazing Star



Tall Cinquefoil

- Leaves are compound with 7–11 leaflets; toothed; very fuzzy
- Flowers have white petals and are arranged in tight clusters
- TNC Locations: OGL, ABR, BR



Sulphur Cinquefoil

- Leaves have 5–7 leaflets and are razor toothed; not hairy
- Flowers have light yellow petals and are arranged in branched clusters
- TNC Locations: OGL



Silverweed

- Leaves are compound; leaflets are razor toothed; underside of leaves is noticeably white/silver
- Creeping; often forms a mat of interconnected leaves
- Flowers arise on a separate, leafless stalk; petals are yellow
- TNC Locations: ABR



Prairie Loosestrife

- Leaves are linear and very thin
- Flowers droop and hang upside down
- TNC Locations: ABR, BR



Prairie Loosestrife

Lance-Leaved Loosestrife



Lance-Leaved Loosestrife

- Leaves are "lance" shaped and much wider than those of Prairie Loosestrife
- Flowers have a red circle in center of flower; droop and hang upside down
- TNC Locations: ABR

Kentucky Bluegrass

- Round stem
- Boat-shaped leaf tip
- Long and thin leaves
- TNC Locations: OGL, ABR, BR



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Joseph M. DiTomaso, University of California - Davis, Bugwood.org

Canada Bluegrass

- Flat stem
- Boat-shaped leaf tip
- Long and thin leaves
- TNC Locations: OGL, ABR



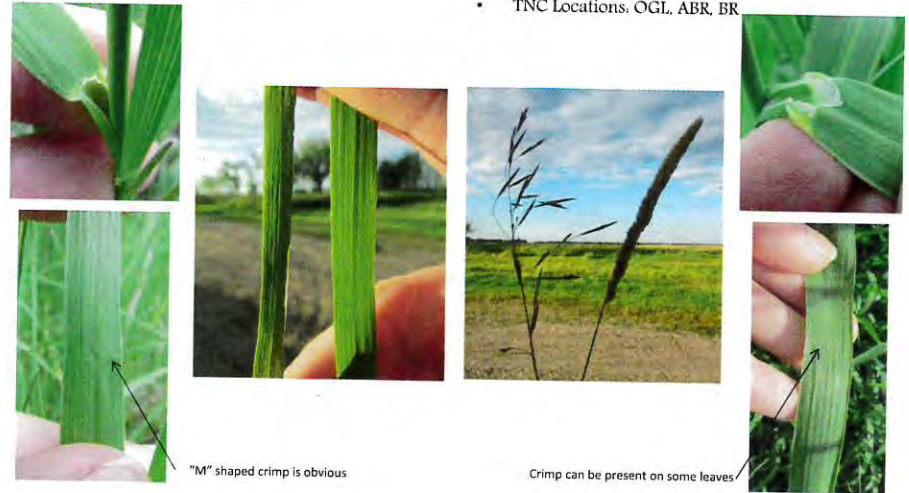
Redtop

- Round stem
- Wider, shorter leaves
- Tall ligule
- TNC Locations: ABR, BR



Smooth Brome

- No ligule
- Narrower leaf than reed
- "M" shaped crimp present
- TNC Locations: OGL, ABR, BR



"M" shaped crimp is obvious

Crimp can be present on some leaves

Reed Canary Grass

- Ligule present
- Wide, erect leaf
- Larger leaves can have a crimp, but look for the presence of a ligule
- TNC Locations: OGL, ABR, BR

Wheatgrasses

- Quackgrass:
 - Largest leaves of these species
 - 6–10 mm wide
 - Not strongly ridged
 - Can have hairs
 - Open sheaths
 - Well developed auricles that clasp stem
 - Internodes are small—only 4–6 mm long
 - Sod-forming grass
 - TNC Locations: ABR, BR
- Slender Wheatgrass
 - Leaves are 2–5 mm wide
 - Somewhat ridged
 - Auricles may be present
 - Internodes are 7–9 mm long, with the lowest over 12 mm long
 - Clump-forming grass
 - TNC Locations: BR
- Crested Wheatgrass
 - Leaves are 1.5–6 mm wide
 - Somewhat ridged
 - Open sheaths
 - Auricles are usually present
 - Smallest internodes of these species
 - 0.7–5 mm long
 - Spikelets are three times as long as internodes
 - Clump-forming grass
 - TNC Locations:
- Many other wheatgrasses can also be found in some of these areas, such as Western wheatgrass, intermediate wheatgrass, and Canada wild rye to name a few. Consult a grass field guide for more help distinguishing all of these species.

Queen Anne's Lace

- Flower cluster is very flat-topped
- Leaves resemble those of a carrot



Hemlock

- Flowers are arranged in small clusters and then in a more rounded cluster; resembles the shape of Golden Alexander flower clusters
- Leaves are compound and much larger than those of the other two species



Yarrow

- Individual flowers are larger and more pronounced than the other two species; arranged in a dense, rounder cluster
- Leaves are fern-like and very distinctive



Crown Vetch

- Grows in clusters
- Leaflets are smaller and lie flat
- There are many more leaflets per leaf
- Flowers are arranged in a circular cluster
- Flowers are light pink
- TNC Locations.



Marsh Vetchling

- Vine; does not grow in clusters
- Leaflets are larger and fold upwards
- There are fewer leaflets per leaf
- Flowers are usually singular or paired
- Flowers are more purple and larger
- TNC Locations. OGL, ABR



Canada Thistle

- Leaves often have a whitish underside, but not stark white like native thistles
- Flowers are the smallest of these 4 thistles and are lighter pink, rather than bright pink to purple like the other 3 species
- Spines are very thin, not "winged"
- Stems can be reddish or green; have small spines, not numerous
- TNC Locations. OGL, ABR, BR

Musk Thistle

- Leaves. Not hairy underneath like Plumeless; not as sharply lobed as Bull; resemble Canada the most
- Stems. Smooth; no spines near top of stem underneath flower, unlike Bull and Plumeless that have spines all the way up the stem
- Flowers. Pink; largest of these thistles; nodding; before blooming, buds have triangular-shaped bracts, unlike 3 other thistles
- TNC Locations.

Bull Thistle

- Leaves are spiny and thinner/more sharply lobed than Plumeless; have long spines at the ends of the teeth
- Stems are "spiny-winged" and often have reddish lines running vertically up them
- Flowers are large and purple; before blooming, the buds are round and have spiny bracts
- TNC Locations. BR

Plumeless Thistle

- Leaves are spiny and larger/thicker than Canada's
- Stems. Very spiny-winged up *entire* stem
- Flowers. Bright pink; spiny bracts; head smaller than Bull's but larger than Canada's
- TNC Locations. OGL

Canada Thistle



Bull Thistle



Musk Thistle



James R. Allison, Georgia Department of Natural Resources, Bugwood.org

Plumeless Thistle



Todd Pfeiffer, Klamath County Weed Control, Bugwood.org



Luke T. Kok, Virginia Polytechnic Institute and State University, Bugwood.org



Steve Dewey, Utah State University, Bugwood.org

Sweet Clover

- Toothed all the way around leaflets
- TNC Locations. OGL, ABR, BR



White Clover

- Round leaflets
- Solid, dark green
- TNC Locations. OGL, ABR, BR



Black Medick

- Toothed only on top edge of leaflets
- Grows low to the ground
- TNC Locations. OGL, ABR, BR



Red Clover

- Round leaflets
- Dark green with light colored triangle on leaflets
- TNC Locations. OGL, ABR, BR



Alfalfa

- Toothed only on top edge of leaflets
- Grows taller and leaflets are larger
- TNC Locations. OGL, ABR, BR



Alsike Clover

- Round leaflets with more pointed tips
- Light green
- TNC Locations.



Common Buckthorn

- Rougher looking leaves; not shiny
- Leaf veins are rounded and are all directed towards the tip of the leaf; 3-5 veins per leaf
- Finely toothed leaves



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Glossy Buckthorn

- Shiny leaves
- Leaf veins resemble a typical "V" pattern; 8-9 veins per leaf
- Untoothed leaves



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

American Elm

- Uneven leaf base
- Tend to have smoother, shinier leaves, but can also be rough



Karan A. Rawlins, University of Georgia, Bugwood.org

Siberian Elm

- Even leaf base
- Tend to have a rougher leaf texture, but can also be smooth



