

Grassland Plant Survey Manual

Virginia Working Landscapes (VWL) began in 2010 in response to a strong grass-roots demand from regional landowners, citizens, and conservation NGOs for leadership from the Smithsonian on how to sustain native biodiversity on working landscapes. What began as a dynamic network of regional stakeholders convened by the **Smithsonian Conservation Biology Institute (SCBI)**, is now an emergent and vital program of the SCBI that studies and promotes the sustainable use of Virginia's landscapes for native biodiversity through ecosystem research, habitat monitoring, and community engagement.



Why Grassland Plants?

From the outset, VWL determined that grassland dependent species in particular require protection. According to The International Union for Conservation of Nature (IUCN), grasslands are "the most endangered, the most altered, and the least protected biome on the planet." Today, many plants and animals that depend on

grasslands have declined, due primarily to the loss or fragmentation of their native habitat. Humans are profoundly impacting native plant species diversity through land use changes, such as urban development, and the introduction of nonnative species. As Virginia's human population continues to grow we expect further depletion of native plant communities and a shrinking diversity of other native taxa within ecosystems. One-third of North American species considered endangered are found on grasslands.

The bulk of Virginia's landscape is managed by private landowners, a significant proportion of which has been cleared for agriculture and is subject to a variety of management approaches and methods. Surveys of plant communities on working farms allow ecologists to track the effects of these management methods on plant diversity and supplies important data to answer a variety of research questions. For example, do restored native warm-season grasslands or fallow fields support higher species diversity among grassland-obligate songbirds? The grassland plant surveys help us answer such questions and allow us to determine the plant species composition of each survey site, which can provide insight into habitat quality and the impact of land use on plant communities.

Goals and Objectives of VWL Plant Surveys

- How will current land-use practices (and projected changes thereto) impact grassland biodiversity?
- How are ecosystem services, like pollination, related to species presence or native biodiversity?
- How does the establishment or maintenance of native grasses impact plant communities?

Accessing Private Properties

Many of our field sites are privately owned. At the beginning of each site visit, place the provided VWL signs in your car window to let landowners know that you are there to conduct surveys. Only drive and park in designated areas as illustrated in the property maps provided to you. You will be notified if you are responsible for contacting the landowner/property manager before visiting your site as the 2 | Page instructions differ for each site. Some landowners may wish to join you for your survey. This is allowed and encouraged.

If any of your sites are on public land (state parks, national park, etc.) then it is likely that you will always need to carry a research permit with you. Make sure to obtain a copy of this from the VWL survey coordinator.

Plant Survey Protocol

To determine plant species occurrence and diversity, field team members identify plant species along a straight line transect at each survey point. Each transect consists of seven 1m² quadrats, with most sites having three points. A total of 21quadrats will therefore be sampled during each site visit. Sites are visited twice, once in the early summer and once in the late summer of each year. Please follow along our training video: <u>https://youtu.be/rHWU3Ak4KBo</u>

EQUIPMENT LIST

REQUIRED	RECOMMENDED
Meter poles (2)	Hat
Compass &/or GPS	Sunglasses
Notebook or field plant press	Sunscreen
Datasheets	Work gloves
Clipboard	Field Boots
ID aids (field guides, floras, grass ID handouts, etc.)	Insect repellent
Pens/pencils (pencils better in case of rain)	
Hand lens/loupe	
Water	
Lunch and ample snacks	

IDENTIFYING YOUR SURVEY PLOTS

Survey waypoints will be provided to survey teams as GPS points on site maps and are identified as point A, B or C. This map can also be used to make navigating to survey 3 | P a g e VWL Grassland Plant Survey Manual | last updated April 2025 locations easy. Waypoints are placed at least 200 meters apart from one another in most fields so that survey plots do not overlap.

CONDUCTING A TRANSECT SURVEY

The early summer season goes from **1 June to 30 June**. The late summer survey season goes from **1 August to 31 August**. If necessary because of weather or logistical difficulties, surveyors are allowed to complete surveys after the season closing date. To stay organized, make a schedule with your partner before the survey season starts.

Surveyors will go out in pairs; one person will be the primary for plant identification while the other records observations and collects samples of unknown species.

Use a GPS unit and the provided map to locate your first survey point. Once you reach the first point, fill out the required information at the top of your data sheet. **ALWAYS** make sure to fill out this information **before** starting your survey; do not leave any spaces blank.

Once these initial steps are complete, you can begin your plant survey:

- 1. At Point A use the first 'Heading' (e.g. A: 120 degrees, 10 meters) indicated on the site directions sheet (which will be provided).
- Using a compass to follow the bearing, pace to the first designated distance and put down a 1m² sampling quadrat (which will be provided).
 - Consistent rules in placing the quadrat can help avoid bias, whether conscious or unconscious (choosing a slightly more open area, including a cool plant, etc.).
 - One method is for the surveyor to avoid looking down during the last couple of steps and then to place the quadrat with the center of the back edge touching the toe of their boot.
- Estimate the percent of the quadrat covered by bare soil, rock, and vegetation, in 10% increments (0, 10, 20, etc.). Record "P" (indicating "present") for anything less than 10%. The datasheets have spaces for each of these categories.
 - Enter a value (which may be a zero) for each of these three categories for every quadrat you survey.
- 4. Identify all vascular plants rooted within the quadrat.
 - Certainty is more important than identifying everything to species (see identification tips below).

Vegetation should include all plant tissue (woody or herbaceous, living or dead) rooted in, on the ground in, or winding through the quadrat (vines).

Areas covered by **fungi**, **lichens**, **or non-vascular plants like mosses and algae** may be ignored (please note if they comprise greater than 10%).

- 5. On the same line as each species, record whether plants are in flower (FL), fruit (FR), or both (FL/FR), and then record the percent of the quadrat the species covers, in 10% increments (10, 20, 30, etc.). Record "P" for anything less than 10%.
 - The covers of multiple species can overlap to add up to more or less than 100%.
- 6. Using two, 1-meter sampling poles stacked end-to-end, sample quadrat corners. Stack poles to two meters in height and place them in one corner of the sample quadrat and record whether forb (F), grass/sedge (G), or woody (W) plant touches the pole in each of the decimeter (10 cm) divisions, up to 2 meters.
 - Do not record the species, only an F, G, or W (or GW, FGW, etc.) for each

touched segment. Next, move to the diagonal corner of the quadrat, repeat this step, and record the touches.

- 7. Collect samples of all unidentified species. Assign each a unique name on the datasheet.
 - A good practice is to name samples by the location and a short, descriptive name that includes the growth form, like "Blandy CSG A4 sprawling grass". If found in subsequent plots, use the same name.
- 8. Repeat the previous steps at each of the remaining transects. Complete 21, 1meter square quadrats.
- 9. You may record an **Incidentals** plot, if there are plants in the field that were not captured within your plots.
- 10. Lastly, visually check the field to assess the major species (1-4) in flower at the time, and record these in the space near the top of the datasheet.

Pressing plant samples can be done in the field or more carefully at home if samples are collected in large Ziplock bags first. If taking samples home for pressing, please guard against wilting or crushing by keeping samples cool (a cooler and icepack can help), and safe from damage. Use scrap paper to label samples (a smaller Ziplock bag inside the sample bag may help protect labels). Label samples according to the following:

- Name assigned to the species
- Date
- Names of the collectors
- Site name (both property and field names)
- The transect letter, heading, and distance.

Entering Data

Please follow along with our training video: <u>https://youtu.be/STpF_ou6sdo</u>. After each site visit, enter the data collected during plant surveys into the provided Excel file. Each file comes with an example sheet, accessible by clicking on the "Example Datasheet" tab at the bottom of the worksheet. Save completed datasheets as "2025_JUNE/AUGUST_Site_VWLPIantData.xIs" and send to <u>ShibleyE@si.edu</u> and/or

IzlarN@si.edu. For example, the June survey data for Oxbow Pond would be saved in an Excel file as "2025_JUNE_OxbowPond_VWLPlantData.xls".

An example field data sheet and Excel spreadsheet are attached at the end of this protocol.

Example Plant Survey Datasheet

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Sample Excel Datasheet

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1 0	property	field	comma)	date	ran	lea l	datasheet	code	latin.validation	common.validation	status	Cover	Flower or Fruit	ver%	soil%	rock%	other%	with an "I")	Major Flow	ering Spp.	Notes
29 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 50	SCAR7	SCAR7	Schedonorus arundinaceus	tall fescue	introduced	100	FR	100	P	0	0		SCAR7	0-FF	
30 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 50	SOCAC4	SOCAC4	Solanum carolinense var. co	Carolina horsenettle	native	P		100	P	0	0		SCAR7		
31 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 50	POA	POA	Poa	bluegrass	introduced	20		100	P	0	0		SCAR7		
32 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 50	Orchard	DAGL	Dactylis glomerata	orchardgrass	introduced	P	FR	100	Р	0	0		SCAR7		
33 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	SCAR7	SCAR7	Schedonorus arundinaceus	tall fescue	introduced	100	FR	100	Ρ	0	0		SCAR7		
34 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	POPR	POPR	Poa pratensis	Kentucky bluegrass	introduced	30	FR	100	P	0	0		SCAR7		
35 M	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	RUBUS	RUBUS	Rubus	blackberry	uncertain	P		100	P	0	0		SCAR7		
36 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	PERSIC	PERSIC	Persicaria	knotweed	uncertain	Р		100	Ρ	0	0		SCAR7		
37 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	OXALIS	OXALI	Oxalis	woodsorrel	native	P		100	Ρ	0	0		SCAR7		
38 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	TRRE3	TRRE3	Trifolium repens	white clover	introduced	d P		100	Ρ	0	0		SCAR7		
39 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	ACALY	ACALY	Acalypha	copperleaf	native	Р		100	Ρ	0	0		SCAR7		
40 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A 6	200 70	VITIS	VITIS	Vitis	grape	native	Р		100	P	0	0		SCAR7		
41 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A		Lambs quarters	CHAL7	Chenopodium album	lambsquarters	introduced	đ						1	SCAR7		
42 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A		Bladder campion	SIVU	Silene vulgaris	maidenstears	introduced	4						1	SCAR7		
43 M	Varrator	Narrator	Natalie Izlar	6/21/2023	A		CANUtans	CANU4	Carduus nutans	nodding plumeless thist	le introduced	d .						1	SCAR7		
44 M	Varrator	Narrator	Natalie Izlar	6/21/2023	A		Timothy	PHPR3	Phleum pratense	timothy	introduced	4						1	SCAR7		
45 M	Varrator	Narrator	Natalie Izlar	6/21/2023	A		Arthraxon	ARHI3	Arthraxon hispidus	small carpetgrass	invasive							1	SCAR7		
46 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A		Perilla	PEFR4	Perilla frutescens	beefsteakplant	introduced	d						1	SCAR7		
47 1	Varrator	Narrator	Natalie Izlar	6/21/2023	A		Pokeweed	PHAM4	Phytolacca americana	American pokeweed	native							1	SCAR7		
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NAVIGATING THE EXCEL DATASHEET

The taxonomic authorities VWL and our project collaborators utilize are the Flora of Virginia (BRIT Press, Fort Worth, Texas, USA) and the USDA Plants Database (online; <u>https://plants.sc.egov.usda.gov/java/</u>). Incidental data can be recorded as Species identification sessions are organized and hosted by VWL. Citizen scientists bring specimens collected during field work to ID sessions, where keying is done under supervision of Virginia Native Plant Society collaborators and other subject matter experts. Following ID sessions, workers enter data electronically using Microsoft Excel. These datasheets are then submitted to the VWL Survey Coordinator for review and incorporation into the VWL Plant Database.

Property:	property name
Field:	field name (if applicable)
Surveyor Names:	survey team members by first and last name; separated by
	comma
Date:	date of survey
Transect:	Transects are sequenced A, B, or C
Plot:	quadrat number (1-7) associated with each transect
Heading:	directional heading from point in degrees (0-360)
Distance:	distance of each quadrat from point
Code:	four letter alpha code for each plant species
% Cover:	percentage of quadrat covered by each species (1-100)
Flower/fruit:	FL=flowering; FR=fruiting; FL/FR=flowering and fruiting at once
Veg%:	percentage of quadrat with vegetation
Soil%:	percentage of quadrat with exposed soil
Rock%:	percentage of quadrat with exposed rock
Other:	percentage of quadrat covered by any other material
Incidentals	Mark which species are incidentals with an "I"; Helpful to enter
	these after the 7 plots have been entered to avoid
	confusion/repetition
Major flowering spp	qualitative assessment of dominant flowering species across field
Notes:	anecdotes