

# 2021 LREC Phenology Report

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## Introduction









“Phenology is nature’s calendar—when cherry trees bloom, when a robin builds its nest and when leaves turn color in the fall.” - USA National Phenology Network

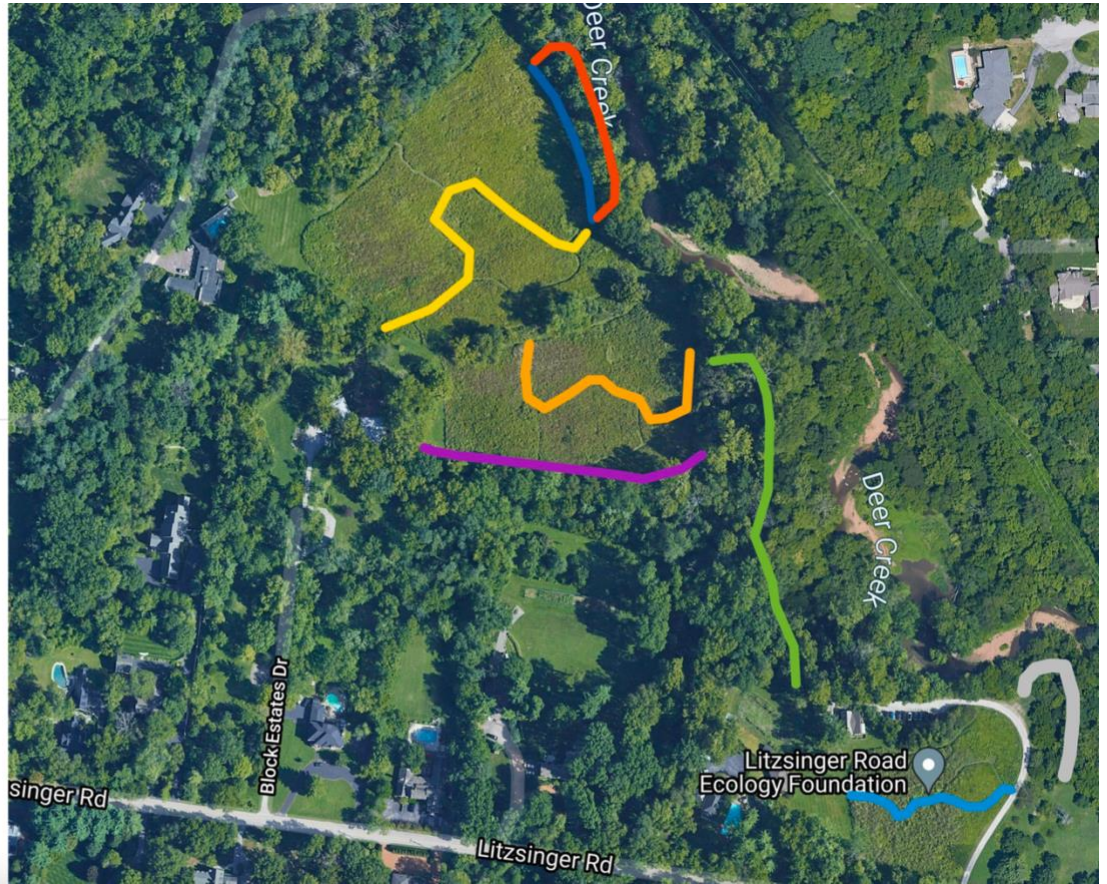
Phenology is the study of the timing of recurring biological events in the animal and plant world, the causes of their timing regarding biotic and abiotic forces. Leaf unfolding, flowering of plants in spring, fruit ripening, color changing and leaf fall in autumn as well as the appearance and departure of migrating birds and the timing of animal breeding are all examples of phenological events.

Our long-term phenology study at the Litzsinger Road Ecology Center focuses on the timing of flower bloom in our prairies and woodlands. The study has been ongoing since 2014, modelled after a similar study done at Shaw Nature Reserve.

There are 8 paths (transects) throughout the LREC property that we (staff, interns and occasional volunteers) walk once a week, recording every species that we see in bloom, starting from the first flower in Spring to the last in Fall.

LREC Phenology transects

-  Mulch Woods
-  North Edge
-  North Prairie
-  North Woods
-  Pasture Prairie
-  South Edge
-  South Prairie
-  South Woods



Transect Number	Transect Name	Habitat Type
1	North Prairie	Wet-Mesic Prairie
2	North Woods*	Riparian Woods
3	North Edge*	Prairie/Woodland Transition
4	South Prairie	Wet-Mesic Prairie
5	South Woods	Riparian Woods
6	Pasture Prairie	Wet-Mesic Prairie
7	South Edge	Prairie/Woodland Transition
8	Mulch woods*	Riparian Woods

\*Due to the MSD Project Clear construction, the North Edge and North Woods transects have been cut shorter and the Mulch Woods transect is gone completely and wasn't counted this year.

## Why is this information useful?

Not only does it give us an excuse to make time specifically to go outside and look for flowers, but tracking these data allow us to keep records of seasonal changes in flowering, and help us answer some interesting questions, such as:

1. What is the peak flowering period for the woodland vs the prairie?
2. Does the timing of the first flowers of spring or the last flowers of fall change from year to year?
3. Are certain species observed one year, and absent the next? Could a species' presence/absence be caused by environmental factors (hot summer, late season frost etc) or in response to our land management work (prescribed burning, herbicide use, etc)?
4. Is there a difference in flowering time between the same species on different transects? Or species of the same genus in the same transect? (Common milkweed- *Asclepias syriaca* vs. Swamp milkweed – *Asclepias incarnata*)
5. Are there certain pollinating insects that are observed only when specific plants are flowering?

Some organizations, such as the US National Phenology Network can use large-scale, long-term data from many different sources to assess the effects of climate change on phenological events across the world.

Our own data set isn't yet large enough to track long-term changes, but we still find it useful for monitoring our plant communities from year to year and answering some questions.

## 2021 Results

Over the course of our phenology monitoring this year, we had a total of 2,685 observations of 211 flowering plant species over 38 weeks, from March 3 – November 10.

See the appendix at the end for the complete list of plant species.

### Overall Calculations

observations	2685
weeks	<u>38</u>
species	211

### Observations by Transect

<b>Transect</b>	<b>Observations</b>	<b>Species</b>
North Prairie	638	103
South Prairie	467	100
Pasture Prairie	454	88
North Woods	164	62
South Woods	385	84
North Edge	238	57
South Edge	339	85

# Phenology comparisons

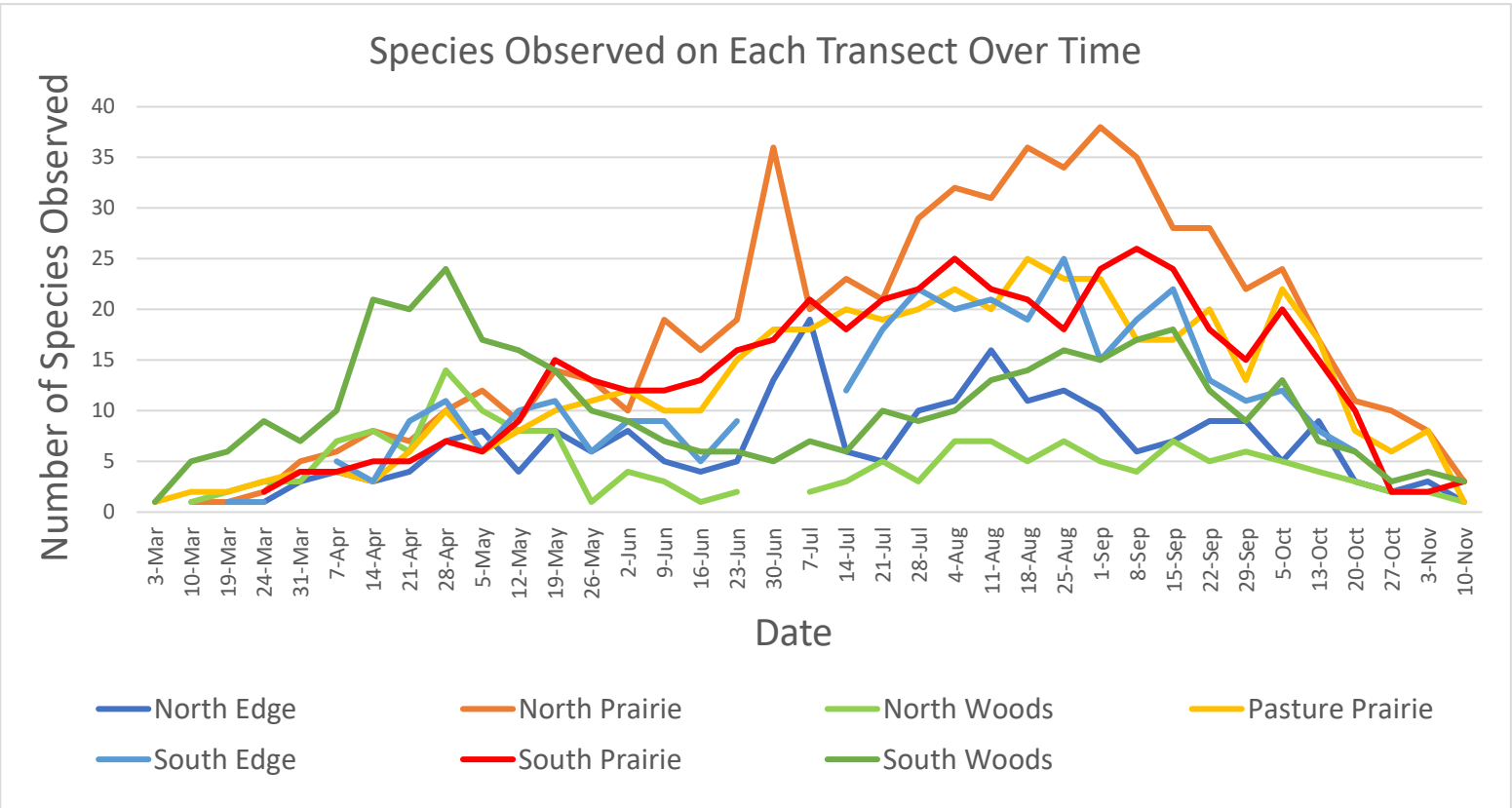


Figure 1. Each colored line in this graph tracks how many flower observations were made on each date throughout our study period for each different transect.

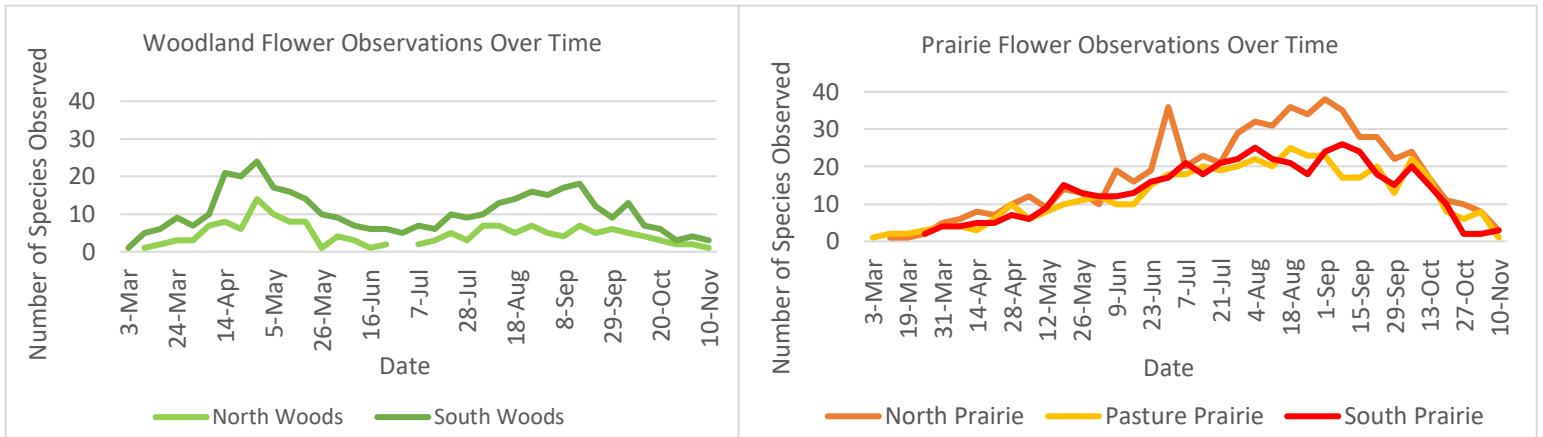


Figure 2. By isolating the graph lines by habitat type, we can see the difference in seasonality of flower abundance between the woods and the prairie. The woodlands typically have higher counts of flowering species in the Spring and the prairies are higher in the summer.

Figure 3. This chart shows the relative period for each species recorded in the 3 prairie transects throughout the year. For species that occur in more than one prairie, the very first and very last observation were used. The length of the bar indicates how long each species is in flower. Here we can see not only the maximum length of the flowering period, but also how the bloom times are staggered throughout the year.

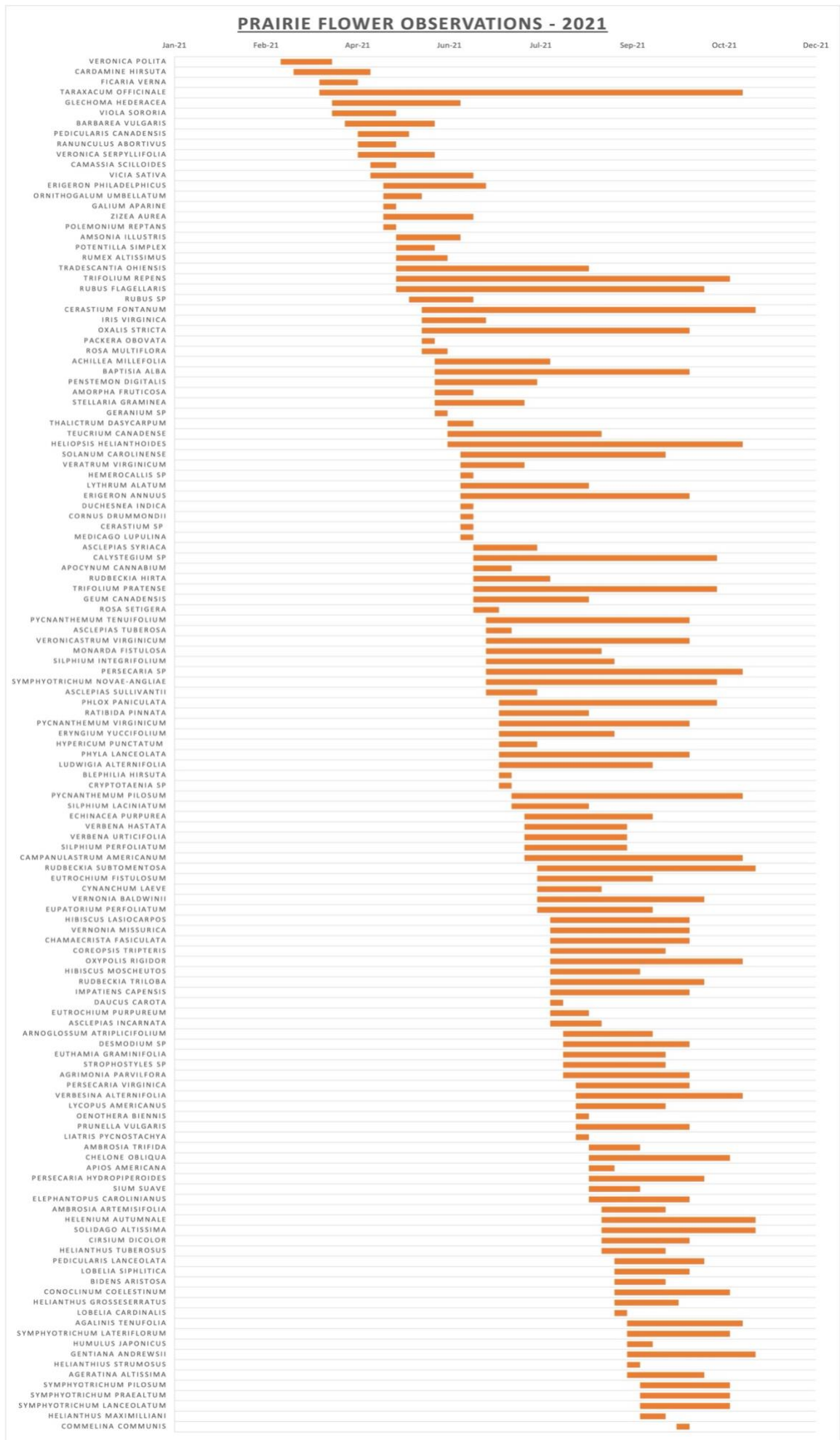




Figure 4. This chart shows the relative bloom period for each species in both the North and South Woods transects. For species that were found in both woodland areas, the very first and very last observations were used to calculate the maximum bloom period.

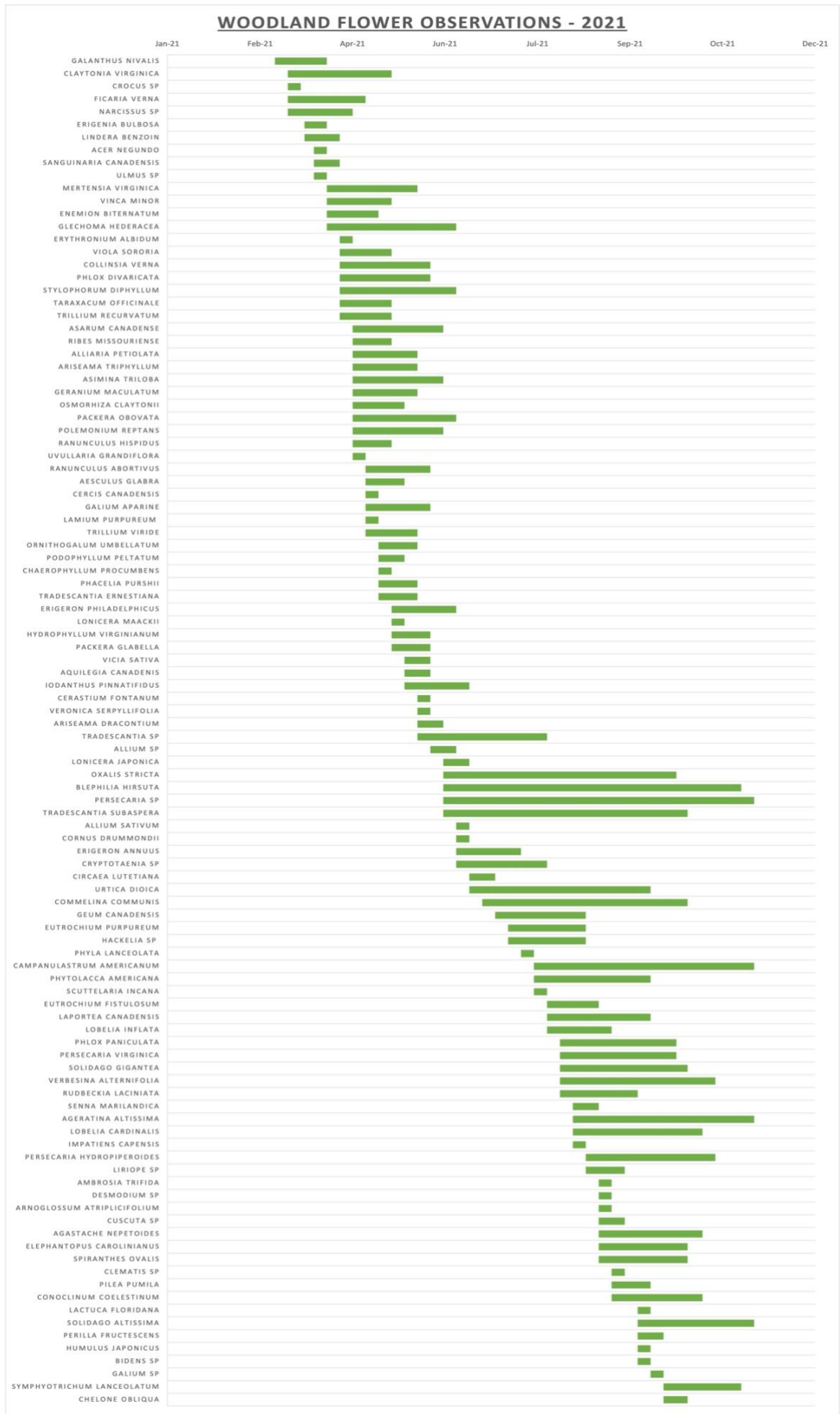
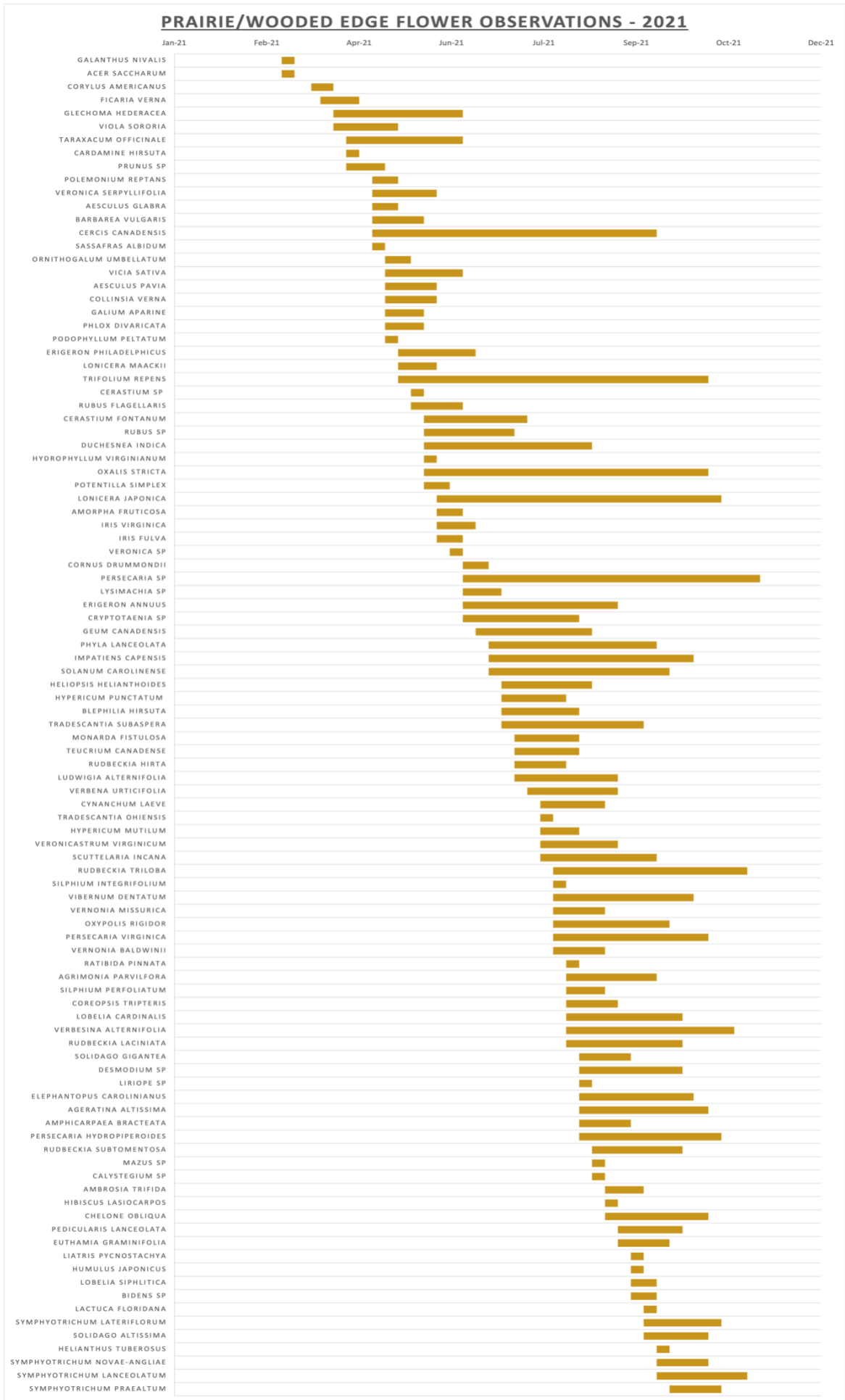


Figure 5. This chart shows the relative bloom period of each species found along both the North and South Edge transects. For species found along both edges, the very first and very last observations were used to calculate the maximum bloom period.





## Conclusion

From these figures, we can see the length of our flowering season at LREC. Many species of insects and other wildlife rely on flowers (or their following fruits and seeds) throughout the year, and many species are only in bloom for a short amount of time. This is an important fact to consider when establishing a native planting or a garden at home. If you want to provide food sources for native wildlife throughout the year, you need a diverse mix of plants that bloom at different times throughout the year.

Most the flower activity in the Spring occurs in the woodlands, where most of the early ephemeral species appear. Then there is a little bit of a slow season late May- early June, until the first wave of prairie flowers starts to bloom. There is also a noticeable dip between July and August while the summer-blooming species begin to fade, and the fall prairie flowers begin to appear. This might be useful for teachers and educators who want to create lesson plans involving flower observations.

These data are only from this year, we still have past years' data that we can analyze and make comparisons with. We plan on continuing to collect higher quality data in the future, and one day we will combine all our collected data over many years and do in-depth analysis to look for long-term trends.

If you're interested in learning more about phenology or maybe doing some observations yourself and starting your own project, here are a couple good community science programs that you may find very useful. They also have some interesting maps and analysis tools you can explore.

[Nature's Notebook](#), a project of the [USA National Phenology Network](#)

[Budburst](#), a project of the Chicago Botanical Garden

## Appendix

### Complete list of Recorded Flowering Plant Species in the 2021 Phenology Season\*

<u>Species observed</u>	<u>Common name</u>	<u>Habitat</u>
Acer negundo	box elder	Woodland
Acer saccharum	silver maple	Edge
Achillea millefolia	yarrow	Prairie
Aesculus glabra	Ohio buckeye	Woodland,Edge
Aesculus pavia	red buckeye	Edge
Agalinis tenuifolia	purple false foxglove	Prairie
Agastache nepetoides	yellow giant hyssop	Woodland
Ageratina altissima	white snakeroot	Prairie,Woodland,Edge
Agrimonia parviflora	swamp agrimony	Prairie,Edge
Alliaria petiolata	garlic mustard	Woodland
Allium sativum	wild garlic	Woodland
Allium sp	wild onion	Woodland
Ambrosia artemisiifolia	common ragweed	Prairie
Ambrosia trifida	giant ragweed	Prairie,Woodland,Edge
Amorpha fruticosa	false indigo bush	Prairie,Edge
Amphicarpaea bracteata	hog peanut	Edge
Amsonia illustris	shining bluestar	Prairie
Apios americana	groundnut	Prairie
Apocynum cannabinum	dogbane	Prairie
Aquilegia canadensis	wild columbine	Woodland
Ariseama dracontium	green dragon	Woodland
Ariseama triphyllum	jack-in-the-pulpit	Woodland
Arnoglossum atriplicifolium	pale indian plantain	Prairie,Woodland
Asarum canadense	wild ginger	Woodland
Asclepias incarnata	swamp milkweed	Prairie
Asclepias sullivantii	prairie milkweed	Prairie
Asclepias syriaca	common milkweed	Prairie
Asclepias tuberosa	butterfly weed	Prairie
Asimina triloba	pawpaw	Woodland
Baptisia alba	white false indigo	Prairie
Barbarea vulgaris	yellow rocket	Prairie,Edge
Bidens aristosa	showy bidens	Prairie
Bidens sp	bidens	Woodland,Edge
Blephilia hirsuta	wood mint	Prairie,Woodland,Edge
Calystegium sp	bindweed	Prairie,Edge
Camassia scilloides	wild hyacinth	Prairie
Campanulastrum americanum	tall bellflower	Prairie,Woodland
Cardamine hirsuta	hairy cardamine	Prairie,Edge
Cerastium fontanum	mouse ear chickweed	Prairie,Woodland,Edge

<i>Cerastium</i> sp	chickweed	Prairie,Edge
<i>Cercis canadensis</i>	redbud	Woodland,Edge
<i>Chaerophyllum procumbens</i>	spreading chervil	Woodland
<i>Chamaecrista fasciculata</i>	partridge pea	Prairie
<i>Chelone obliqua</i>	rose turtlehead	Prairie,Woodland,Edge
<i>Circaea lutetiana</i>	enchanter's nightshade	Woodland
<i>Cirsium dicolor</i>	field thistle	Prairie
<i>Claytonia virginica</i>	spring beauty	Woodland
<i>Clematis</i> sp	clematis	Woodland
<i>Collinsia verna</i>	blue-eyed Mary	Woodland,Edge
<i>Commelina communis</i>	asiatic dayflower	Prairie,Woodland
<i>Conoclinium coelestinum</i>	mistflower	Prairie,Woodland
<i>Coreopsis tripteris</i>	tall coreopsis	Prairie,Edge
<i>Cornus drummondii</i>	Drummond's dogwood	Prairie,Woodland,Edge
<i>Corylus americanus</i>	American hazelnut	Edge
<i>Crocus</i> sp	crocus	Woodland
<i>Cryptotaenia</i> sp	honestwort	Prairie,Woodland,Edge
<i>Cuscuta</i> sp	dodder	Woodland
<i>Cynanchum laeve</i>	honeysuckle milkweed	Prairie,Edge
<i>Daucus carota</i>	Queen Anne's lace	Prairie
<i>Desmodium</i> sp	tick trefoil	Prairie,Woodland,Edge
<i>Duchesnea indica</i>	mock strawberry	Prairie,Edge
<i>Echinacea purpurea</i>	purple coneflower	Prairie
<i>Elephantopus carolinianus</i>	elephant's foot	Prairie,Woodland,Edge
<i>Enemion biternatum</i>	false rue anemone	Woodland
<i>Erigenia bulbosa</i>	harbinger-of-spring	Woodland
<i>erigeron annuus</i>	annual fleabane	Prairie,Woodland,Edge
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	Prairie,Woodland,Edge
<i>Eryngium yuccifolium</i>	rattlesnake master	Prairie
<i>Erythronium albidum</i>	white trout lily	Woodland
<i>Eupatorium perfoliatum</i>	common boneset	Prairie
<i>Euthamia graminifolia</i>	grass leaved goldenrod	Prairie,Edge
<i>Eutrochium fistulosum</i>	hollow-stem joe pye weed	Prairie,Woodland
<i>Eutrochium purpureum</i>	joe pye weed	Prairie,Woodland
<i>Ficaria verna</i>	lesser celandine	Prairie,Woodland,Edge
<i>Galanthus nivalis</i>	snowdrops	Woodland,Edge
<i>Galium aparine</i>	bedstraw	Prairie,Woodland,Edge
<i>Galium</i> sp	bedstraw	Woodland
<i>Gentiana andrewsii</i>	bottle gentian	Prairie
<i>Geranium maculatum</i>	wild geranium	Woodland
<i>Geranium</i> sp	geranium	Prairie
<i>Geum canadensis</i>	white avens	Prairie,Woodland,Edge
<i>Glechoma hederacea</i>	deadnettle	Prairie,Woodland,Edge
<i>Hackelia</i> sp	stickseed	Woodland
<i>Helenium autumnale</i>	sneezeweed	Prairie
<i>helianthus strumosus</i>	woodland sunflower	Prairie
<i>Helianthus grosseserratus</i>	sawtooth sunflower	Prairie
<i>Helianthus maximilliani</i>	Maximillian sunflower	Prairie
<i>Helianthus tuberosus</i>	Jerusalem artichoke	Prairie,Edge

<i>Heliopsis helianthoides</i>	false sunflower	Prairie,Edge
<i>Hemerocallis</i> sp	day lily	Prairie
<i>Hibiscus lasiocarpus</i>	rose mallow	Prairie,Edge
<i>Hibiscus moscheutos</i>	swamp rose mallow	Prairie
<i>Humulus japonicus</i>	Japanese hops	Prairie,Woodland,Edge
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	Woodland,Edge
<i>Hypericum mutilum</i>	dwarf St. John's wort	Edge
<i>Hypericum punctatum</i>	Spotted St. John's wort	Prairie,Edge
<i>Impatiens capensis</i>	jewelweed	Prairie,Woodland,Edge
<i>Iodanthus pinnatifidus</i>	purple rocket	Woodland
<i>Iris fulva</i>	copper iris	Edge
<i>Iris virginica</i>	southern blue flag iris	Prairie,Edge
<i>Lactuca floridana</i>	false lettuce	Woodland,Edge
<i>Lamium purpureum</i>	henbit	Woodland
<i>Laportea canadensis</i>	wood nettle	Woodland
<i>Liatris pycnostachya</i>	prairie blazingstar	Prairie,Edge
<i>Lindera benzoin</i>	spicebush	Woodland
<i>Liriope</i> sp	liriope	Woodland,Edge
<i>Lobelia cardinalis</i>	cardinal flower	Prairie,Woodland,Edge
<i>Lobelia inflata</i>	indian tobacco	Woodland
<i>Lobelia siphilitica</i>	blue lobelia	Prairie,Edge
<i>Lonicera japonica</i>	Japanese honeysuckle	Woodland,Edge
<i>Lonicera maackii</i>	bush honeysuckle	Woodland,Edge
<i>Ludwigia alternifolia</i>	seedbox	Prairie,Edge
<i>Lycopus americanus</i>	water horehound	Prairie
<i>Lysimachia</i> sp	yellow loosestrife	Edge
<i>Lythrum alatum</i>	winged loosestrife	Prairie
<i>Mazus</i> sp	creeping mazus	Edge
<i>Medicago lupulina</i>	black medick	Prairie
<i>Mertensia virginica</i>	Virginia bluebell	Woodland
<i>Monarda fistulosa</i>	bee balm	Prairie,Edge
<i>Narcissus</i> sp	daffodil	Woodland
<i>Oenothera biennis</i>	biennial primrose	Prairie
<i>Ornithogalum umbellatum</i>	star-of-Bethlehem	Prairie,Woodland,Edge
<i>Osmorhiza claytonii</i>	sweet cicely	Woodland
<i>Oxalis stricta</i>	yellow woodsorrel	Prairie,Woodland,Edge
<i>Oxypolis rigidor</i>	cowbane	Prairie,Edge
<i>Packera glabella</i>	butterweed	Woodland
<i>Packera obovata</i>	ragwort	Prairie,Woodland
<i>Pedicularis canadensis</i>	swamp betony	Prairie
<i>Pedicularis lanceolata</i>	swamp betony	Prairie,Edge
<i>Penstemon digitalis</i>	foxglove beardtongue	Prairie
<i>Perilla frutescens</i>	beefsteak plant	Woodland
<i>Persecaria hydropiperoides</i>	water pepper	Prairie,Woodland,Edge
<i>Persecaria</i> sp	smartweed	Prairie,Woodland,Edge
<i>Persecaria virginica</i>	jumpseed	Prairie,Woodland,Edge
<i>Phacelia purshii</i>	Miami mist	Woodland
<i>Phlox divaricata</i>	wild sweet William	Woodland,Edge
<i>Phlox paniculata</i>	garden phlox	Prairie,Woodland

<i>Phyla lanceolata</i>	fogfruit	Prairie,Woodland,Edge
<i>Phytolacca americana</i>	pokeweed	Woodland
<i>Pilea pumila</i>	clearweed	Woodland
<i>Podophyllum peltatum</i>	mayapple	Woodland,Edge
<i>Polemonium reptans</i>	jacob's ladder	Prairie,Woodland,Edge
<i>Potentilla simplex</i>	cinquefoil	Prairie,Edge
<i>Prunella vulgaris</i>	self heal	Prairie
<i>Prunus sp</i>	wild plum	Edge
<i>Pycnanthemum pilosum</i>	hairy mountain mint	Prairie
<i>Pycnanthemum tenuifolium</i>	narrow-leaved mountain mint	Prairie
<i>Pycnanthemum virginicum</i>	common mountain mint	Prairie
<i>Ranunculus abortivus</i>	small-flowered buttercup	Prairie,Woodland
<i>Ranunculus hispidus</i>	hispid buttercup	Woodland
<i>Ratibida pinnata</i>	gray headed coneflower	Prairie,Edge
<i>Ribes missouriense</i>	gooseberry	Woodland
<i>Rosa multiflora</i>	multiflora rose	Prairie
<i>Rosa setigera</i>	prairie rose	Prairie
<i>Rubus flagellaris</i>	dewberry	Prairie,Edge
<i>Rubus sp</i>	blackberry	Prairie,Edge
<i>Rudbeckia hirta</i>	black-eyed susan	Prairie,Edge
<i>Rudbeckia laciniata</i>	goldenglow	Woodland,Edge
<i>Rudbeckia subtomentosa</i>	sweet coneflower	Prairie,Edge
<i>Rudbeckia triloba</i>	brown-eyed susan	Prairie,Edge
<i>Rumex altissimus</i>	pale dock	Prairie
<i>Sanguinaria canadensis</i>	bloodroot	Woodland
<i>Sassafras albidum</i>	sassafras	Edge
<i>Scutellaria incana</i>	downy skullcap	Woodland,Edge
<i>Senna marilandica</i>	wils senna	Woodland
<i>Silphium integrifolium</i>	rosinweed	Prairie,Edge
<i>Silphium laciniatum</i>	compass plant	Prairie
<i>Silphium perfoliatum</i>	cup plant	Prairie,Edge
<i>Sium suave</i>	water pasnip	Prairie
<i>Solanum carolinense</i>	horse nettle	Prairie,Edge
<i>Solidago altissima</i>	tall goldenrod	Prairie,Woodland,Edge
<i>Solidago gigantea</i>	giant goldenrod	Woodland,Edge
<i>Spiranthes ovalis</i>	lesser ladies tresses orchid	Woodland
<i>Stellaria graminea</i>	grass leaved chickweed	Prairie
<i>Strophostyles sp</i>	trailing wild bean	Prairie
<i>Stylophorum diphyllum</i>	celandine poppy	Woodland
<i>Symphotrichum lanceolatum</i>	panicked aster	Prairie,Woodland,Edge
<i>Symphotrichum lateriflorum</i>	calico aster	Prairie,Edge
<i>Symphotrichum novae-angliae</i>	New England aster	Prairie,Edge
<i>Symphotrichum pilosum</i>	frost aster	Prairie
<i>Symphotrichum praealtum</i>	willow aster	Prairie,Edge
<i>Taraxacum officinale</i>	dandelion	Prairie,Woodland,Edge
<i>Teucrium canadense</i>	American germander	Prairie,Edge
<i>Thalictrum dasycarpum</i>	meadow rue	Prairie
<i>Tradescantia ernestiana</i>	woodland spiderwort	Woodland
<i>Tradescantia ohiensis</i>	Ohio spiderwort	Prairie,Edge

<i>Tradescantia</i> sp	spiderwort	Woodland
<i>Tradescantia subaspera</i>	zigzag spiderwort	Woodland,Edge
<i>Trifolium pratense</i>	red clover	Prairie
<i>Trifolium repens</i>	white clover	Prairie,Edge
<i>Trillium recurvatum</i>	prairie Trillium	Woodland
<i>Trillium viride</i>	green Trillium	Woodland
<i>Ulmus</i> sp	Elm	Woodland
<i>Urtica dioica</i>	stinging nettle	Woodland
<i>Uvularia grandiflora</i>	large bellflower	Woodland
<i>Veratrum virginicum</i>	bunchflower	Prairie
<i>Verbena hastata</i>	blue vervain	Prairie
<i>Verbena urticifolia</i>	white vervain	Prairie,Edge
<i>Verbesina alternifolia</i>	wingstem	Prairie,Woodland,Edge
<i>Vernonia baldwinii</i>	Baldwin's ironweed	Prairie,Edge
<i>Vernonia missurica</i>	Missouri ironweed	Prairie,Edge
<i>Veronica polita</i>	gray field speedwell	Prairie
<i>Veronica serpyllifolia</i>	thymeleaf speedwell	Prairie,Woodland,Edge
<i>Veronica</i> sp	speedwell	Edge
<i>Veronicastrum virginicum</i>	culver's root	Prairie,Edge
<i>Viburnum dentatum</i>	arrow-wood viburnum	Edge
<i>Vicia sativa</i>	vetch	Prairie,Woodland,Edge
<i>Vinca minor</i>	periwinkle	Woodland
<i>Viola sororia</i>	common violet	Prairie,Woodland,Edge
<i>Zizia aurea</i>	golden alexander	Prairie

\*Note that this should not be considered a complete list of all flowering plants that occur at LREC, only the species that were found along the phenology paths