

## **2021 Flowering Forb Project Summary For Knox County Park District**

### Purpose and Summary of Project

The purpose of the 2021 plant survey was to establish baseline data for the presence of forbs, herbaceous flowering plants that are not graminoids, within selected parks within the Knox County Park District. The project further determined flowering times for each identified species. During the 2021 growing season, surveyors identified a total of 320 distinct species of forbs.

### Description of Project

During the Winter of 2020/2021, a group of volunteers met and committed to participating in a Knox County Parks district-wide survey of flowering forbs. Each individual agreed to survey specific trails within various Knox County District Parks during the growing season. In general, each surveyor would walk their designated trails on a weekly basis, identifying and recording all the species (forbs) observed in flower on a paper survey report form. The report form was developed by the plant surveyor group. These forms were then submitted either electronically or in paper form to Jean Tahyi, a volunteer who developed an overall database and subsequently entered the data from the plant survey forms.

### Project Participants and Parks/Trails Surveyed

The following is a listing of the individuals who participated in or supported the plant survey project during 2021, including the parks and trails that were surveyed. Note that codes listed correspond to park listings in the database and numbers reflect trail numbers in Wolf Run Regional Park.

Janet Chandler: Project Coordinator, surveyed the following trails:

- Wolf Run Park (MM)
  - Mary Miller Trail (1) including Marshall Meadow (bi-weekly)
- Wolf Run Park (WR-E)
  - Most of Back 40 Trail (5)
  - Overlook Trail (6)
  - Little Deerfield Trail (7)
  - Sub-Alpine Trail (11)
- Honey Run Waterfall (HR-W)
  - Left of main trail and upper ledge

Miriam Dean-Otting, surveyed Wolf Run Park (WR-E)

- Pond Trail (2) from lower parking lot past pond
- Wolf Hollow Trail (4)
- North section of Back 40 Trail (5)

- Beech Trail (connector from trail #5 to trail #7)
- Little Deerfield Trail (7)

Judith Crouse, surveyed Honey Run Waterfall (HR-W)

- Honey Run Waterfall: Main trail including areas to the right of main trail

Susan Guttormsen, surveyed parts of Honey Run Highlands (HR-H)

- Prairie Trail starting at parking lot# 2
- Then 1st path to right- Butterfly Trail-through woods
- Turn left to rejoin Prairie Trail
- Turn right to Bluebird box 7 and bench
- Then back on Prairie Trail to parking lot

Beth Waller

- Indian Field Bluffs Park (IFB):
  - Main trail - past a field, upland along a bluff top then down a bank to a floodplain along the river
  - Spur trail - at halfway point of main trail, down a bank
- Thayer Ridge Park (TR):
  - Parking lot north to Basswood.
  - Basswood to Meadowlark.
  - Meadowlark to Blackberry to the south west portion of Lower Perimeter - past the Vernal Pool.
  - From Lower Perimeter past horse trailer parking, cross lawn to Wood Frog.
  - Wood Frog from the lawn to just past the pond.
- Surveyed mid-March to mid-July

Kathy Noblet, surveyed Wolf Run Park, Knox Woods and surrounding forested area (WR-KW)

- Knox Woods Trail (9)
- Woodland Trail (8) from parking lot to Knox Woods trail (9)

Laurie Thompson, surveyed Wolf Run Park, forested areas surrounding Knox Woods (WR-KW)

- Wolf Run Park: Pond Trail (2) from upper to lower parking lot
- Wolf Run Park: Woodland Trail (8) loop to pond trail including connector trail to Overlook Trail (6)

Laura Letizia, surveyed Hellbender Preserve (HB)

- Observations from March-June

Jon Bossley, surveyed Zuck Riparian Preserve (Z-F)

- Hemlock Ridge Trail from the parking pulloff on Staats Road
- To ridge top in older forest
- Observations from July to early September

Jean Tahyi

- Wolf Run Park: Marshall Meadow (periodically)
- Developed survey form and database form. Entered survey data.

Lori Totman, Knox County Park District Director, provided guidance and support throughout the project. Katie Hux of the Park District also provided support.

Maps and trail names or numbers can be found on the Knox County Park District website at <https://knoxcountyparks.org/>.

### Survey Methodology

Using the plant survey form (attached), plant surveyors began collecting data in late March/early April in 2021. For each data entry, the survey form was designed to capture the following data:

- scientific and common name for each species observed,
- quantities of both plants and flowering plants observed,
- beginning and end dates of observations for flowering of each species, and
- location (park name and trail identification)

#### *Plant Identification:*

Surveyors reported species names (Scientific and common) using Newcomb's Wildflower Guide. Individuals also used several other wildflower guides to aid in identification, most notably the Field Guide to Wildflowers of North America (Brandenburg, D.M.). Volunteers were encouraged to key out species in the field using the Newcomb methodology. The exact methodology for identifying species varied somewhat between plant surveyors. Generally, however, surveyors would record familiar species after confirmation with Newcomb's. They used several approaches to identify unknown or questionable species. When possible, the plant would be keyed out (using Newcomb) in the field. Additionally, many used a plant identification app (e.g. Seek or PlantNet). Typically, when the app clearly identified a plant, this would serve as an initial identification which the surveyor would subsequently confirm, either in the field or at home using pictures and/or a plant specimen. Volunteers would often confirm questionable species in subsequent weeks after an initial identification

The group met together to discuss current observations, usually about once a month. Based on discussion at these meetings, there were instances when most or all plant surveyors agreed to list some plants solely by their genus as it was too difficult to determine the species.

#### *Plant and Flowering Plant Quantities*

Volunteers generally surveyed and reported observations based on what was visible from their designated trails. Each week, they reported both the number of plants as well as the number of

flowering plants for each identified species. They used the following breakdown to report quantities:

- 1 signified 1-9 specimens (plants or flowering plants)
- 10 signified 1-24 specimens
- 25 signified 25-49 specimens
- 50 signified 50 or more specimens

Surveyors entered this data based on an estimate of their observations for any given trail or park.

#### *Flowering – Begin and End Dates*

Volunteers entered a begin date for a given species once the species was in flower. This, generally, would not include the bud stage. Since volunteers would typically survey once a week, this data provides an approximate date for the beginning of flowering. The end date of flowering for each species was captured during the data entry process with the last recorded observation date of flowering becoming the end date for a given species.

#### *Data Recording, Entry and Review*

The plant survey forms were either emailed or dropped off to the data entry volunteer who entered the data into a database throughout the season. Additionally, at the end of the season, each volunteer reviewed and, as necessary, edited the data for accuracy.

#### Limitations of the Results

The 2021 Plant Survey Project was an extensive and complicated project. Much of the protocol was developed somewhat on the fly to match the scope of the project and the expertise and availability of the surveyors. Consequently, the results should not be considered a scientific survey. The survey results do provide an excellent baseline of data for Knox County parks. However, there were numerous challenges during the project which resulted in limitations. These are noted below.

#### *Plant Identification Limitations*

The biggest challenge in accurate plant identification was the sheer number of species observed on a particular survey trip. Typically, surveyors might note 25-30 species at a time, but there were also times when there would be more than 50 flowering species observed. It could easily take 2-3 hours to walk the trail(s), identify the correct species, and record this data. Especially when new species were abundant, surveyors did not have the time to key out each new species while in the field. In these cases, surveyors would take pictures or a plant sample and then try to complete the identification out of the field. This process could be particularly time consuming when many new species were observed in a given week. Given this process, there were also instances when surveyors would submit a specific species one week and then, after further study the following week, would change the species ID. These changes may not have always been picked up on the data entry end.

Additionally, the surveyors varied in their expertise and knowledge of plants, ranging from beginners to individuals with a great deal of expertise. Monthly meetings of the surveyors did help to identify species that were difficult to identify. As a result of these meetings and based on the difficulty of identifying some species, the surveyors began to record just the genus for some of the observations. These are listed in the database but include the following genera: Aster (asters), Cardamine (cresses), Cirsium (thistles), Desmodium (tick-trefoils), Erigeron (fleabanes), Galium (bedstraws), Geum (Avens), Oxalis (wood-sorrels), Polygonum (smartweeds), Ranunculus (buttercups), Solidago (goldenrod), and Viola (violets). However, within each of these genera, surveyors were able to positively identify certain species within the genus. There were also plant observations for which the scientific name has changed, for example, Ragworts are now in the genus *Packera*. However, the data uses the names from Newcomb's Wildflower Guide. For species not listed in Newcomb's, the Field Guide to Wildflowers of North America (National Wildlife Federation) was used.

Finally, observations were not completed throughout the growing season for all of the participating parks. In some parks, surveys may have skipped one or two weeks. In addition, though, the data for the following parks includes survey results only for the periods noted:

- Hellbender (HB): mid-March through June
- Indianfield Bluffs (IFB): mid-March to mid-July
- Thayer Ridge (TR): mid-March to mid-July
- Zuck Riparian Preserve (Z-F): July to early September

#### *Limitations of Plant and Flowering Plant Quantities*

It should be noted first that the process of recording and collating the data about quantities of plants and flowering plants affected the results shown in the databases. Specifically, data in the 'All Areas' database reflects the highest quantity of plants and flowering plants observed in any of the areas in which a given species was found. Additionally, numerous areas, each with its own observation data, encompassed several to numerous trails or sub-areas. Again, the database for a given area reflects only the maximum number of plants and flowering plants found by anyone or on any trail within that area's database. Even the original paper documentation does not include details enumerating quantities of plants/flowering plants based on more specific trails or areas. Thus, for areas including multiple trails, the quantities identified do not reflect that the species was found on every trail or area within that database.

The accuracy of plant quantity should be robust. These were estimates but the ranges for reporting seemed reasonable. Both plant and flowering plant quantities are estimates based on what could be visually identified from trails, so they would not necessarily include larger areas of the parks. In some instances, plant quantity might be over-estimated when two species of the same genera were present in an area, such as Pale and Spotted Touch-me-nots.

The quantity of flowering plants was also estimated typically based on what was visible from a trail. When smaller quantities were reported, the quantity observed could also be an

undercount since areas were observed only once every seven days or so. Additionally, the key used for number of specimens (noted above) did not, for some species, accurately capture when a flowering forb was very abundant. So, the designation of 50 might indicate 50 or slightly more than 50 plants, but could also mean there were hundreds of these plants present or flowering at a given time.

#### *Limitations of Flowering Begin and End Dates*

The data related to begin and end dates of flowering has similar limitations to the data for quantities of plants. Flowering dates reflect the limitations of the observation frequency and the ability to find specimens located within visual distance of any given trail. Begin and end dates are also incomplete in some cases when observations for a particular location ended prior to the end of the growing season.

#### *Limitations of Data Recording, Data Entry and Review of Data*

The Survey Form, used to collect data in the field, was developed solely for the purpose of this project. As the project progressed, volunteers started having challenges with the original form. As a result, the team made changes and clarifications to the form relatively early in the process (mid-April?). Although the changes helped, they were not uniformly adopted early in the year. This primarily affected the recording of plant and flowering plant quantities. The form also included space to note location, but this space was not used uniformly. In some cases, surveyors provided detailed location information; in other cases, there was no location information provided or it was limited to identifying just a trail number.

Data entry into the databases also had its challenges. Handwritten species names and locations were frequently hard to read; and spelling of species names was sometimes incorrect. There were also some instances when the surveyor did not provide complete information for each observation. After all the initial data from survey forms was entered into each separate database, each surveyor also reviewed all of their respective data sheets, comparing them to the database and editing or correcting information as needed in the database for their surveyed area(s). This review process involved somewhat extensive spelling corrections and some additional corrections related to both quantities and flowering dates. Although these challenges created additional work to review and edit, the reviews and edits by each surveyor for their areas certainly improved the accuracy of the data.

Once the individual area databases were updated, the project coordinator combined the data from all areas into the final 'All Areas' database. This step allowed for further spelling corrections as well as consistently using the common names for plants based on Newcomb's Wildflower Guide. However, spelling or name corrections made to the 'All Areas' database were not carried back to the databases of each area.

Park and trail surveys were generally conducted weekly from April through October. However, as noted above, some volunteers were unable to complete their observations throughout the

season and one volunteer started collected data in July. Additionally, there were times when a volunteer may have skipped a week or more of observations. The data sheets related to each park or set of trails indicates some of these limitations. These data sheets can be found at the Knox County Park District website [www.knoxcountyparks.org](http://www.knoxcountyparks.org) by selecting each park to locate the data survey.

### Summary of Observation Data

The “2021 All Areas” database provides a summary of all the plants/flowering plants reported from the 2021 plant surveys. This data captures over 250 separate plant survey trips during 2021. Based on these surveys, there were 320 distinct species identified in the surveyed areas of the Knox County Parks. Additionally, each area surveyed has its own database.

### Recommendations for Future Surveys

The surveyors identified a number of areas worthy of attention or follow-up based on the survey procedures and the results.

#### *Data collection procedures:*

- Research whether there is a feasible way to record data electronically while in the field. This did not seem to be an option for data collection in 2021.
- Work is currently being done by the Park District to finalize a data collection form for the 2022 season which will incorporate improvements based on learning from the 2021 season.
- In the 2021 database, a separate tab was established for each area. These areas were set up to facilitate data entry based on which trails/areas were surveyed by a given surveyor or, in some cases by several different surveyors. In the future, these areas and the trails encompassed by each area should be clearly named and identified prior to conducting any plant surveys. It may be worth considering how areas are designated, especially for the larger parks like Wolf Run; possibly area boundaries would be based on the primary ecosystem of the area. Additionally, to facilitate review of data, it would be beneficial to have a separate data area for each surveyor. This would avoid the challenges in reviewing data when an area included observations by multiple surveyors.

#### *Additional Activities or Plant Surveys for the Future*

Given that the Knox County Park District had never had a comprehensive survey of flowering forbs conducted, the primary purpose of this survey was to establish a baseline for the Park District. The survey group identified a number of activities which build on this initial flowering forb survey. They might include any of the following:

- Wildflower walks: Volunteers will be able to use the data for each park to help plan and lead wildflower walks targeting the flowering forbs that are likely to be blooming at the time of the walk. The plant surveyors also gained a great deal of knowledge which will enable them to serve as leaders for these walks.

- Review and edit the database to include native, non-native and/or invasive status for each species identified in the park
- Conduct similar survey in the future to determine whether flowering times are changing over a period of time. This is a particular concern given that flowering times may be impacted by climate change.
- Review and analyze the data to determine peak bloom times for species. This might focus on a limited number of species such as plants which are species of concern or which serve as host species for insects which are species of concern.