

Project Wingspan: Landscape Enhancement for Imperiled Pollinators



Seed Collection Manual

**POLLINATOR
PARTNERSHIP**

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Acknowledgements

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1. Introduction

Thank you for participating in Project Wingspan (PW). PW is a multi-year project sponsored by grants from the National Fish and Wildlife Foundation (NFWF) through the non-profit Pollinator Partnership.

This training manual is a comprehensive collection of the information, protocols, and forms related to Project Wingspan and will help standardize the seed collection process to ensure responsible collection and data integrity. Please use this manual as a reference in part, or in total, to meet the needs of your level of responsibility (State Coordinator, State Lead, Team Lead, and Collection or Data Entry Volunteer) as indicated by Pollinator Partnership. See the accompanying training webinar: (<https://www.pollinator.org/wingspan/seed-collection>) for more detail.

1a. Program Objective

This program is designed to increase the quality, quantity, and connectivity of monarch, rusty patched bumble bee (RPBB), and other imperiled pollinator habitat and to increase interest and skill in seed collection. Project Wingspan builds on the success Pollinator Partnership (P2) and its team of core partners have had in building a regional seed collection program in the Midwest and Great Lakes region a previously funded NFWF project, Monarch Wings Across the Eastern Broadleaf Forest (MWAEBF).

PW has historically targeted eight states located within the Midwest and Great Lakes Region for seed collection and distribution: Arkansas, Illinois, Indiana, Michigan, Minnesota, Ohio, Pennsylvania, and Wisconsin. Today, PW continues to operate in Indiana and Illinois with possible extension into other states in the future. PW is still catalyzing additional habitat enhancement in all of these states through P2's online technical training webinars focusing on best management practices for public land managers and private land stewards. All seed generated from this project will be used to support the development of geographically appropriate native plant materials for the enhancement of monarch, RPBB, and other imperiled pollinator habitat.

1b. Project Goals

To successfully meet program objectives, the following tasks will be performed:

1. Facilitate a regional seed collecting program for the Midwest and Great Lakes region to help meet increased immediate needs for regionally specific monarch & RPBB supporting plantings.

- Regionally-specific milkweed and forage plant seed is generally commercially unavailable in large quantities within the Midwest and Great Lakes region. In order to successfully enhance monarch, RPBB, and other imperiled pollinator's habitat, a temporary coordinated regional milkweed and forage plant seed collection and distribution network have been established.

- Seed collecting protocols across the region for this project are standardized. Seed collectors will be recruited and trained according to the protocol. All collectors will work off a single plant species target list. Seed will be processed at a cleaning center, inspected for weeds, and then used for seedling propagation or reseeding efforts at project sites for imperiled pollinator habitat establishment.
- Any seed collections found to be contaminated by weeds will be removed from the inventory and destroyed.
- Seed collection and distribution zones within each state have been identified utilizing a mixture of ecoregional and provisional seed zone boundaries. All native plant materials generated from the seed collecting efforts will be redistributed within the same state collection zone in order to maintain genetic variability and resilience across milkweed and forage plant populations and assist with the goal of enhancing of habitat across the Midwest and Great Lakes region.

Provide training to volunteers and technical assistance to public and private land managers in the Midwest and Great Lakes region.

- Technical assistance for the various land use and management types (private lands, private working lands, public lands) will be provided through promotion of a P2 webinar series focusing on pollinator habitat enhancement and maintenance best management practices and techniques, including: seeding, plug planting, invasive plant removal, seedbed preparation, controlled burning, and plug planting preparation.
- Project Wingspan will also be provides educational support and technical guidance to land managers through in-person workshops across active states.

2. Long-term monarch & RPBB habitat establishment and enhancement. - A preliminary online habitat survey will be used to identify existing habitat areas, along with areas that are seeking further enhancement, and those with near future planned establishment.

- The acres included and reported in the program will be secured through a letter of long-term commitment (minimum of 5-years), signed by the land manager or landowner. The letter will include enhancement and/or management actions that qualify habitat areas for inclusion in the program.
- The agreements will be made through Pollinator Partnership; additional agreements may be made through other core program partners.
- The Pollinator Partnership will track all the acres counted towards the 15,625-acre goal.
- The agreements will ensure that monarch & RPBB habitat activities take place on lands that have a landowner or manager committed to imperiled pollinator conservation and long-term habitat management and maintenance.

2. Partners

All partners and associated activities operate within the current project area, and the outcomes of this effort will be applicable across other states in the region with similar plant communities and growing conditions. Utilizing seed collection and distribution zones within our target states complements efforts of the U.S. Forest Service's seed transfer zones and other native plant materials programs, including the National Seed Strategy for Rehabilitation and Restoration. The core group of partners includes:

- Illinois Department of Natural Resources – Mason State Nursery
- Pollinator Partnership
- U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program
- U.S. Forest Service

3. Target Plant Species List

All species listed below were cross-referenced with the USDA PLANTS Database and BONAP (Biota of North America Program) to determine nativity within each state throughout the Midwest and Great Lakes region. All plants are generally considered common, but may vary in abundance across the collection states. While many of the target species can be collected in all participating seed collection states, some species may be regionally-specific and should not be collected in certain states, as specifically identified in this section. To address this, the plant list includes a number of host plant and forage species to ensure that collection teams in each state have numerous options from which to collect. The target plant list has been reviewed, collaborated on, and vetted across the region.

Many of these species have similar characteristics to other plants making proper plant identification crucial. To aid in identification, detailed plant profiles can be found in Appendix A. Print copies of the plant profiles will be distributed to Team Leads by P2 as they are requested and while supplies last. The digital PDF version of the plant profiles will be available online (<https://www.pollinator.org/wingspan/seed-collection#download>) for all teams to use in the field.

Project Wingspan Target Plants for Seed Collection		Bloom Period											
Latin (Botanical) Name	Common Name	J	F	M	A	M	J	J	A	S	O	N	D
<i>Zizia aurea</i>	golden Alexanders				X	X	X						
<i>Tradescantia ohiensis</i>	Ohio spiderwort				X	X	X	X					
<i>Geranium maculatum</i>	wild geranium				X	X	X	X					
<i>Lupinus perennis</i>	wild lupine					X	X						
<i>Penstemon digitalis</i>	foxglove beardtongue					X	X	X					
<i>Echinacea pallida</i>	pale purple coneflower						X	X					
<i>Asclepias syriaca</i>	common milkweed						X	X	X				
<i>Asclepias exaltata</i>	poke milkweed						X	X	X				
<i>Echinacea purpurea</i>	purple coneflower						X	X	X				
<i>Senna marilandica</i>	Maryland senna						X	X	X				
<i>Verbena stricta</i>	hoary vervain						X	X	X				
<i>Asclepias incarnata</i>	swamp milkweed						X	X	X	X			
<i>Asclepias tuberosa</i>	butterfly weed						X	X	X	X			
<i>Asclepias verticillata</i>	whorled milkweed						X	X	X	X			
<i>Chamaecrista fasciculata</i>	partridge pea						X	X	X	X			
<i>Heliopsis helianthoides</i>	oxeye sunflower						X	X	X	X			
<i>Oenothera biennis</i>	common evening primrose						X	X	X	X			
<i>Pycnanthemum tenuifolium</i>	narrowleaf mountainmint						X	X	X	X			
<i>Pycnanthemum virginianum</i>	Virginia mountain mint						X	X	X	X			
<i>Ratibida pinnata</i>	yellow coneflower						X	X	X	X			
<i>Rudbeckia hirta</i>	black eyed Susan						X	X	X	X			
<i>Veronicastrum virginicum</i>	Culver's root						X	X	X	X			
<i>Verbena hastata</i>	blue vervain						X	X	X	X			
<i>Impatiens capensis</i>	jewelweed							X	X	X			
<i>Eupatorium perfoliatum</i>	common boneset							X	X	X			
<i>Euthamia graminifolia</i>	grass-leaved goldenrod							X	X	X			
<i>Eutrochium maculatum</i>	spotted Joe-pye weed							X	X	X			
<i>Eutrochium purpureum</i>	sweet joe pye weed							X	X	X			
<i>Liatris pycnostachya</i>	prairie blazing star							X	X	X			
<i>Liatris spicata</i>	dense blazing star							X	X	X			
<i>Monarda fistulosa</i>	wild bergamot							X	X	X			
<i>Coreopsis tripteris</i>	tall coreopsis							X	X	X	X		
<i>Helenium autumnale</i>	sneeze weed							X	X	X	X		
<i>Liatris aspera</i>	tall blazing star							X	X	X	X		
<i>Vernonia gigantea</i>	giant ironweed							X	X	X	X		
<i>Oligoneuron rigidum</i>	stiff goldenrod								X	X	X		
<i>Symphotrichum laeve</i>	smooth blue aster								X	X	X		
<i>Symphotrichum novae-angliae</i>	New England aster								X	X	X		

4. Training and Communication

It is extremely important that groups and individuals collecting seed for PW are well trained so that plant species are properly identified, plant populations are not harmed during the collection process, and the protocol is followed to ensure data integrity.

Training courses will be offered periodically, and an online training module has been developed to provide comprehensive training for Wingspan seed collection teams (<https://www.pollinator.org/wingspan/seed-collection>). Before becoming a Team Lead or making PW seed collections, it is highly recommended that at least one member of the team (all team members are encouraged) participate in the training course. If you are a Team Lead and need to train a collection team, contact P2 or your State Coordinator for more information.

4a. Communication

PW Team Leads and Volunteer Seed Collectors should direct all questions and concerns to their State Coordinators. To contact P2 directly, call 415-362-1137 or email info@pollinator.org. State Coordinator, Pollinator Partnership staff, and additional regional support contacts can be found in Appendix H.

5. Permission to Collect

Seed collection may take place on private or public lands managed by a federal agency (e.g. Fish and Wildlife Service, USDA Forest Service, and Department of Defense) or state, county, or municipal agencies, as long as landowner/manager permission is provided. Document permissions on the field data form associated with the seed collection. If seed collection will occur on state lands or right of way areas, a right of entry permit must be obtained as well as notification of your presence regarding date, time and total persons that will be on site. Right of entry permits can be obtained from district or county DOT offices or State Park offices. Plan ahead – you will not get a permit overnight. Sample Right of Entry Permit and Notification Documents can be found in Appendix D.

If you are a Team Lead and have arranged for your State Coordinator to obtain your collection permit, you will need to have a copy of the permit on hand when you visit the site. Additionally, you will need to sign a Hold Harmless Document that will release your State Coordinator and Pollinator Partnership from any damages that may inadvertently occur while you are utilizing the permit in the name of a third party. A sample Hold Harmless Document / Volunteer Waiver Form can be found in Appendix E.

6. Preliminary Site Visits

Preliminary site visits are often necessary to assess populations of target species, confirm the identification/location of specimens, and estimate likely harvesting date and potential seed production. It is important that a knowledgeable botanist leads the

collection team and is involved in identifying the plants and the most suitable populations for seed collection. Additionally, where populations are suitable and the quality and quantity of seed is adequate, it may be possible to make collections of multiple target species from the same site. Team Leads can make preliminary site visits to confirm plant identification when the plants are in flower and mark populations for their volunteer collection teams to return to when the seeds mature.

Begin by assessing the target population and confirming that a sufficient number of individual plants have seeds at natural dispersal stage. This will ensure that adequate genetic diversity can be sampled from the population, and that the seeds are likely to be at maximum viability and longevity.

Carefully examine a small, representative sample of seeds using a cut test and for smaller seeds a hand lens.

To perform a cut test: Seed should be dry, dark, and relatively loose in its shell. Cut the seed open and examine the contents, the material inside should be a lighter colored embryo. If the embryo is dark or dry like the outer shell, the seed may be damaged or dead. The presence of insect damage is an indicator of damaged material. Doing cut tests will help you to estimate the frequency of empty or damaged seeds and confirms that the majority of seeds are mature and fully formed. Use this information as a guide for when to hold your collection event.

How to identify a plant population:

- A population is a group of individuals (of the same species) living within the same collection site, continuous in range, and generally uniform in appearance.
- Consider plants within a 3-mile radius around your main collection site to be the same population.
- To avoid collecting from the same population in two separate collections (of the same species), do not allow the 3-mile radius of two sites to overlap. There should be at least ½ mile separation of the radii. If collecting different species from the sites, overlap is not an issue.
- To gain the most representatively balanced sample of seeds, collecting should be conducted in an even and random method from a *minimum* of 50 plants.

7. Preventing the Spread of Noxious Weeds and other Hazards

In natural resource work, including seed collections, equipment and organisms may be purposefully or inadvertently moved from one location to another. This provides the potential for the spread of non-target species to invade new habitat. Non-target species are the plants, animals, diseases, pathogens, and parasites that are not intended to be moved. As responsible environmental stewards, it is essential that we do our best to reduce our impact and prevent the movement of invasive and noxious species whenever possible. Please use the following protocols before, during, and after each collection.

Come Clean and Educated

- Before leaving the home, inspect your gear and remove dirt, plants, and seeds from clothing, boots, gear, and vehicles. When possible, wear low-tread footwear that doesn't hold soils, seeds, plant parts, or invertebrates.
- Learn to identify the problem weeds you might encounter. It's easy to learn to identify the problem weeds in most areas and you can find a host of free identification guides wherever you are or are going.
- There are many websites available to learn about your local problem weeds and invasive species. Check out your state Department of Natural Resources (or similar), www.playcleango.org, or www.invasivespeciesinfo.gov to name a few.

During the Collection

- Avoid parking in weed patches. Most weeds spread along roadways and corridors, as vehicles can easily transport many types of weeds and seeds. If you are driving off the pavement, try to identify a course that will avoid weeds.
- Avoid walking through weed patches. Many weed seeds will cling to clothes, shoes, and even hair. If you avoid walking through weeds you will reduce the amount of seed that you might be transporting.
- Avoid unintended seed dropping into your collection container by keeping it closed or covered when walking through the site.
- If collecting with two hands and setting the collection container on the ground, ensure nothing weedy is above you and could drop in the container if you bump it.
- Be mindful of your clothing and make sure that if weed seeds get on your sleeves while navigating the site, then you brush them off before putting your arms in your container.
- If collecting from numerous sites in one day, clean all gear between each site.

Leave Clean

- It is important to clean in the right location. If possible, clean your gear on-site at the end of your trip.
- Carefully inspect yourself and your equipment at the end of your trip. Weed seeds will cling to most materials so be sure to carefully check everything for weed seeds. Do this before you leave a site and throw the seeds in the trash. Pay special attention to pant cuffs, shoes (including laces), and socks. Use a stiff brush, stick, or small screwdriver to help remove soils, seeds, plant parts, or invertebrates; use boot brushes and other removal devices when possible.
- Do not clean clothing, footwear, or gear in or near waterways – it may promote the spread of invasive species downstream.
- Use a 70% alcohol solution to sanitize boots and equipment.

- Don't let weeds hitchhike away from the site. If you are not able to clean before you leave the site, make sure to clean in a place where there is no possibility of anything getting away, and dispose of removed materials in the trash.
- If you have parked or driven through weeds, wash your vehicle undercarriage as soon as possible after leaving a weedy area. Go straight to the car wash without any delay. As soon as you drive out of the weeds, the seeds will begin to spread. Make sure to spray the undercarriage of your vehicle with high pressure water to wash off any seeds. Only wash inside the car wash bay and never spray weed seeds outside the car wash bay.

Take Extra Precaution

Incorporate invasive species prevention into planning for the collection event.

- Place cleaning stations at entrance and exit points
- If necessary, plan travel routes to avoid areas of heavy infestation.
- Identify species in the field to educate participants.
- Provide a 70% alcohol solution to sanitize boots and equipment.

Safety Concerns

Make sure to bring plenty of water (minimum one liter). Wear bright clothes when working near roads, and do not collect along busy highways. Wear comfortable, well-fitting shoes and socks, and bring gloves. Dress in layers appropriate for the weather and season.

Be careful when handling milkweed plants, as the sap can harm your eyes. The initial irritation can be painful, followed by a cloudiness of the cornea, which can take a week to clear up. Take the following steps to avoid transferring milkweed sap to yourself or your fellow volunteers:

- Wear gloves while collecting milkweed pods
- Avoid contacting your face with your hands or gloves
- Wash your hands carefully after handling milkweed pods
- If milkweed sap gets into your eyes, seek medical attention immediately - Inform your team lead of any allergies, such as to latex

Always check for ticks after leaving the field. Look where you step and always remain aware of your surroundings. Watch for poison ivy, poison oak, poison sumac, wild parsnip, and giant hogweed. Do not venture anywhere alone or without informing your team lead.

8. Field Documentation and Data Forms

Use a copy of the Project Wingspan Field Data Form in Appendix B for each seed collection and fill out all the data fields. Fill out a data form for each species collected even if you collect many species from the same location. Data should be recorded in the field to ensure all pertinent information is retained. Keep the original form for your records as you will need to send a copy of this data form with your related seed collection to Mason State. There is a Team Lead Collection Tracking Sheet in Appendix I. This sheet is to be used to track Collection ID numbers to prevent duplication. It will also be used to track collection and shipping dates onto a centralized sheet. Notify your State Coordinator by email after the collection has been made to document the collection of the species.

In order to maintain genetic integrity and resilience across native milkweed and forage plant populations, color-coded seed collection and distribution zones have been identified for each target state (See Appendix J). Team Leads can reference the county level map for their state in Appendix J to identify in which zone their collection site is located (green, orange, or blue). This information is also automatically generated for you when filling out the state and county fields within the Survey123 app (See Appendix G for additional details). Please record your collection zone in the Field Data Form and make sure it is clearly written on the outside of the seed bag sent to Mason State Nursery. This information is key for proper processing, cleaning, and grow out of the seed.

8a. Seed Collection Reference Number Format

PW seed collection teams use the following format to identify their collections:

The Seed Collection Reference Number will include three parts: **Seed Collection Team reference ID** (state abbreviation and collection team number), **project site ID** (represented by letters a-z) and **collection number**;

- For example, **IN.CT1.A-3** for Indiana seed Collection Team 1's third collection at site A.

Seed collection reference numbers should be unique and sequential across sites and from year to year, and should never be repeated. If the last collection of the previous year was 34, the next year's collection numbering should start with 35. The same goes for project site ID, each new site should be unique and sequential. See Appendix C for Collection Team reference IDs and Appendix B for a filled-out example of a Field Data Form.

Examples:

Indiana collection team 1 collects their first collection of the season, *Asclepias incarnata*, at a local park. The seed collection reference number would be as follows:
IN.CT1.A-1

Indiana collection team 1 goes to the same site and their next collection is a new species (*Rudbeckia hirta*). The seed collection reference number would be as follows:
IN.CT1.A-2

- If revisiting a site to collect a new species, utilize the same project site ID, but assign a unique collection number.

Indiana collection team 1 now goes to a new site and collects from *Asclepias incarnata*. The seed collection reference number would be as follows:

IN.CT1.B-3

- Even though it is the same species that was sampled at project site A, it is a different population (it is found at site B), with unique genetics, so it is recorded as a new collection number.
- If a site is revisited and the same species is collected from that same site, but on a different date, that information can be added to the original data sheet, without creating a new record. This would happen if not enough seed was mature at the first visit, and a second visit is necessary to collect from the same population.

9. Seed Collecting Tools

Before you leave for your seed collection trip, you will want to make sure you have the following items:

- Collection container such as paper bags (Sandwich lunch bags or grocery paper bags)
- Permanent black marker or pencil
- Pruners, heavy scissors, or garden clippers
- Heavy garden gloves
- Large storage container (To hold bags of harvested seed)
- GIS Application pre-loaded on your mobile device to acquire latitude and longitude (this information can also be gathered by using the Survey123 app while in the field)
- Data forms
- Permits (when applicable)

10. Seed Collection Protocol

Following proper seed collection protocol (cited in the USFWS Policy Regarding Controlled Propagation of Species Listed under the Endangered Species Act

(FR65:183, p56916), collect propagules from each of the known populations on the target species list.

In order to ensure genetically representative propagules suitable for plant reintroductions, we will adhere to the following guidelines recommended by Bureau of Land Management Seeds of Success Program (BLM-SOS):

- Collect no more than 20% of the available seed on the day of collection. Collect randomly from a diverse selection of plants regardless if characteristics are rare or common (do not select for only the plants with the largest blooms, unique colors, etc.).
- If the genetics are unknown, collect as broadly (in an area) as possible to collect the most diverse selection of material.
- When populations are abundant, collecting from every 5th plant is a good way to randomize collection.
- Prioritize sites where populations are of wild origin
- Do not collect in the early morning, before the dew has evaporated. Seed should be dry when collected.
- While collecting, keep track of the number of plants from which you have harvested seeds and report that number to the data collector.

11. Seed Collection

Collect mature, dry seeds and contain them in double-bagged brown paper bags. Large collections can be made using plastic buckets and then transferred into bags. As discussed in Section 7 above, take care to prevent the collection and spread of non-target species. Specific information regarding collection and cleaning of target plants is detailed in Section 12. Do not collect in the early morning, before the dew has evaporated. Seed should be dry when collected.

Do not allow collections to overheat, and do not leave them in a vehicle or in full sun. Exposure to sustained high temperatures can damage seed collections. Always maintain ventilation around the collections, if making more than one collection on a field day, bring the existing collections outside of the car and leave in a shady spot. Damp collections should be spread out on newspaper to dry naturally in a well-ventilated area immediately after collection. For further explanation of the seed collection techniques, please see the quick reference guide in Appendix F.

11a. Labeling Your Seed Collection

Like the data forms, the information you record on your collection bag will aid in the tracking of the seed throughout its life in Mason State Nursery until it is planted at its final habitat restoration site. Write the following information below on the outside of your

collecting bag. If using a cloth bag, write the information on a jeweler's tag and tie it to the bag. It is imperative that this information is accurate so please label your seed collection bags in the field as you collect and record the following information:

- Latin name
- Common name
- Collection date
- County, State
- State collection zone color (green, orange, or blue)
- Collector's name
- Unique collection team Seed Collection Reference Number (See Section 8 for details)
- If multiple bags are needed to hold the seed from one collection, make sure to mark them 1 of 2, 2 of 2, etc.

12. Recommendations for Collection and Cleaning for Specific Target Plants

Estimated monthly collection periods for each species are detailed in the Plant Profiles in this manual (Appendix A). This will vary based on the region, weather, and annual growing conditions, but these periods can serve as an estimate timeline. Preliminary site visits will provide a more accurate indication of seed ripeness and will inform when collection should occur.

Asclepias spp., milkweed

Collection Time: Late summer

Collect seed pods as they turn yellow or greyish brown and begin to split. White fluff will likely be visible. Seed should be brown and plump when harvested. Do not collect pods with holes as these seeds are likely nonviable due to insect damage. Put the entire pod in the collection bag. Split open pod to remove seed and fluff. If you clean the seeds inside, you will likely have the downy fluff floating around the room as it is quite buoyant.

Cephalanthus occidentalis, buttonbush

Collection time: Late summer to early fall

Collect before the 'nutlets' start to fall apart. Seeds are ready for collection when they turn brown. Cut the 'nutlet' off the stem and put it into your collection bag.

Chamaecrista fasciculata, partridge pea

Collection Time: Fall

Seeds ripen in pods. Pods turn from green to brown when they are ready for harvest.

Spilt open some of the pods in the field to see if the seeds are brown and plump. If the seeds are still green, they are not ready. It is easiest to collect several pods and put them in your collection bag. When indoors, peel the pods to release the seeds.

Coreopsis tripteris, tall coreopsis

Collection Time: Late summer to fall

Seed is ready for harvest when the heads turn yellow to brown. Ripe seed is grayish black in color and resembles a sunflower seed. Seeds are inside the calyx tubes that make up the flower head. Place entire dried flower head into the collection bag.

Echinacea purpurea, eastern purple coneflower

Collection time: Late summer to early fall

Seed is ready for harvest when heads turn dark brown to black. Place entire dried flower head into the collection bag. Most of the seeds will fall out readily with light shaking.

Eupatorium perfoliatum, common boneset

Collection Time: Late fall

Seeds ripen about a month after flowering and should be collected when the white fluff begins to dry and expand and the calyx and stem begin to brown. It is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. The white fluff acts as a parachute and the seeds will fly away. Seeds should be dark in color and plump, as flat seeds indicate the embryo has not developed and the seeds are not ripe.

Euthamia graminifolia, grass-leaved goldenrod

Collection time: Fall

Seeds ripen about a month after flowering and should be collected when the white fluff begins to dry and expand and the calyx and stem begin to brown. It is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. The white fluff acts as a parachute and the seeds will fly away. Seeds should be dark in color and plump, as flat seeds indicate the embryo has not developed and the seeds are not ripe.

Eutrochium purpureum, sweet joe pye weed

Collection time: Fall

Seeds ripen about a month after flowering and should be collected when the white fluff begins to dry and expand and the calyx and stem begin to brown. It is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. The white fluff acts as a parachute and the seeds will fly away. Seeds should be dark in color and plump, as flat seeds indicate the embryo has not developed and the seeds are not ripe.

Geranium maculatum, wild geranium
Collection time: Early summer

These seeds are challenging to collect, as the Geranium seed pods burst when ripe and launch the seeds away from the parent plant. You will need to collect before the seed is fully ripe and when the carpel beaks begin to yellow. Remove the umbel and put it in the collection bag. Allow the seed to ripen in the bag. Store them in a cool dry location for two weeks before you lightly smash the carpel to release the seed.

Heliopsis helianthoides, ox-eye sunflower
Collection Time: Fall

Seed will ripen about a month after flowering if the weather is mild. Seed is ready for harvest when the heads turn from yellow to brown. Ripe seed is grayish brown in color. Plants can be self-sterile, so crack some open before collecting to check for viability. Place entire dried flower head into the collection bag.

Impatiens capensis, jewelweed
Collection Time: Late summer to fall

These seeds can be fun, but challenging to collect, as the Impatiens seed pods burst when ripe and launch the seeds away from the parent plant. Pods are slim and green when first forming and as seeds near maturation the pod will become a darker green/brown and form a bulging center. At maturity, a slight touch is enough to burst the capsules and eject the seeds. To gather seed, carefully clasp palm around the ripe pod (avoiding nearby mature fruits) and keep hand closed to prevent losing the seed. They open themselves if ripe. If pods do not "pop" when touched, they are not ready to gather. Seeds should be dark green-brown in color once mature and usually number 3-5 per pod. The plants flower over a long period and fruits will be at various stages of development. You may need to visit the same stand of plants a couple times to get good representative collection of seeds.

Liatris spp., blazing star
Collection time: Fall

The seed is ready for collection when the white fluff begins to dry and expand and the calyx and stem begin to brown. It is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. The white fluff acts as a parachute and the seeds will fly away. Seeds should be dark in color and plump as flat seeds indicate the embryo has not developed and the seeds are not ripe. Seed ripens at the bottom of the stem first, so when the top starts to dry out it is usually safe to start collection.

Lupinus perennis, wild lupine
Collection Time: Summer

The hairy seed pods begin green and slowly turn brown as they mature. Harvest lupine seeds when the pods are dark brown, grey, or black and the seeds inside rattle when

shaken. Seed pods burst when ripe and launch the seeds away from the parent plant. Carefully remove the pods with your fingers or a pair of scissors, making sure they don't burst before being placed into your bag. Lupine seeds are oblong and somewhat flat, less than a quarter inch in diameter and dark brown. Spilt open some of the pods in the field to see if the seeds are brown and healthy. If the seeds are still green they are not ready.

Once harvested, *fold over* the top of the paper bag and store the seeds at room temperature until the pods explode or pop open. Depending on the pod's maturity, this may take a few hours or a few days. Collect the lupine seeds from the bottom of the bag. Some seeds may still be clinging to the pods and can be gently freed by running your finger along the inside of the lupine seed pod. Discard the empty pods.

Monarda fistulosa, wild bergamot

Collection Time: Mid through late summer

Seeds are ready for harvest when the flower head turns from green to brown. Ripened seed is tiny and inside the tiny calyx tubes that make up the flower head. Remove the petals (if there are any remaining) and place entire dried flower head into the collection bag.

Oenothera biennis, common evening primrose

Collection Time: Late summer to fall

Seeds are ready for harvest when the capsule turns from green to greyish-brown. Ripened seed is small, angular, and dark brown/black. If whole stalk is mature – harvest every 5th flowering spike in the population. If only bottom seed capsules are mature on a stalk, either revisit site in 1-2 weeks or remove the mature bottom capsules from each stalk (no more than 20%) and place entire capsule into the collect bag. Once dry, capsules will open further.

Oligoneuron rigidum, stiff goldenrod

Collection Time: Fall

Seeds ripen about a month after flowering and should be collected when the white fluff begins to dry and expand and the calyx and stem begin to brown. It is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. The white fluff acts as a parachute and the seeds will fly away. Seeds should be brown and plump, as flat seeds indicate the embryo has not developed and the seeds are not ripe.

Penstemon digitalis, foxglove beardtongue

Collection Time: Midsummer to fall

Seed ripens in upright capsules that turn from green to brown when ready to harvest. The dried capsules can be cut off stalk of plant and placed in the collection bag.

Pycnanthemum spp., mountainmint

Collection Time: Late summer

Seed heads turn from green to brown when ripe. Cut off the entire seed head and put in the collection bag to dry. Seeds are very tiny and dark brown resembling itty-bitty mouse poop.

Ratibida pinnata, yellow coneflower

Collection Time: Late summer

The seeds form on the inside of the brown or black cone in the center of the flower. When the cone becomes hard and turns grayish or dark brown the seeds are ripe. Remove the entire cone from the plant and put them in the collection bag.

Rudbeckia hirta, black-eyed Susan

Collection Time: Late summer to early fall

The seeds form on the inside of the brown or black cone in the center of the flower. When the cone becomes hard and turns grayish or dark brown the seeds are ripe. This usually occurs three to four weeks after the blooms fade. Remove the entire cone from the plant and put them in the collection bag.

Symphyotrichum spp., asters

Collection Time: Late summer to fall

The seed is ready for collection when the white fluff begins to dry and expand and the calyx and stem begin to brown. It is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. The white fluff acts as a parachute and the seeds will fly away. Seeds should be dark in color and plump, as flat seeds indicate the embryo has not developed and the seeds are not ripe.

Tradescantia ohiensis, Ohio spiderwort

Collection Time: Early summer

Seeds ripen in capsules wrapped in the calyx. The capsules open when the seed is ripe and drop the seeds out quickly. It is best to start checking the seeds about six weeks after they bloom to see if they are ready.

Vernonia spp., ironweeds

Collection Time: Fall

Seeds are ready for collection when the pappus (scales, bristles, or featherlike hairs that are attached to the seeds) is dry and the white fluff begins to expand. Like other members of the composite family, it is easiest to cut off the entire flower head and remove the chaff and fluff from the seed in an area where you are sheltered from the wind. Seeds should be dark in color and plump, as flat seeds indicate the embryo has not developed and the seeds are not ripe.

Veronicastrum virginicum, Culver's root
Collection time: Late Summer

Tiny seeds are produced inside small woody capsules along a spike. Capsules turn from yellow to brown when they are ready to harvest. Remove the whole spike and put it into your collection bag. The seeds can be removed from the stalk, once dried slide your fingers down the stalk and the seeds should fall off into your collection bag.

Zizia aurea, golden Alexander
Collection Time: Summer

Seeds ripen into capsules on the umbel. The capsules turn from green to brown when they are ready to harvest. Remove the entire flower umbel and put into collection bag.

13. Seed Storage

After your collection, let the seed dry for three days in a cool, dark, dry location before shipping to Mason State Nursery. The optimal method for drying seed material is to spread it out in a single layer on newspaper. Placing a fan nearby on the lowest setting can expedite the drying process. If space is a concern, leave the seed in the collection bag, but leave the bag open and stir the seeds at least once a day. Again, a fan on its lowest setting blowing over the bags can help expedite the drying process.

Ship the seed immediately after drying and completing a preliminary cleaning. Leftover bits of plant material (leaves and stems) can promote the growth of mold which will ultimately affect the viability of the seed. Seeds vary greatly in how they need to be cleaned. Refer to unique species information in Section 12 for method of cleaning, if necessary. While it is okay to hold onto seed for a couple weeks (in proper conditions) to allow for shipping collections in bulk, do not keep seed for long periods of time before shipping. Viability of seed can decrease quickly if improperly stored and delaying shipment of the seed also delays cleaning and processing at Mason State Nursery.

Only ship seed Monday through Wednesday to ensure that it arrives at Mason State Nursery before the weekend. If necessary, keep the seed in a cool, dark and dry location until Monday morning. Do not freeze seed and never store or ship seed in plastic.

14. Photo Documentation

Digital photos of the species being collected should always be taken while in the field. Data collectors can take photos with their smartphones and upload directly through the Survey 123 GIS app. Digital Photos not uploaded to the app should be labeled with the unique collection ID number and submitted to your State Coordinator via email by the end of the collection season. At least three photos should be taken for each collection:

1. Landscape level / population

2. Individual plants
3. Material collected (seed)

When possible, you have the option to photograph the flower or leaf structure, depending on what is visible and most helpful in identifying the plant. You may also wish to take a photo of your field data form or any field notes as a backup.

15. GIS App

Team Leads and/or Data Collectors for each team will be assigned login credentials by their State Coordinator in order to use the Survey123 App to acquire specific data about the location of each seed collection, including latitude and longitude coordinates. This data is vital to helping us track the seed from collection through distribution. Specific directions on how to download and use the GIS app are in Appendix G. A training webinar will accompany this manual in order to provide further assistance to seed collection participants.

16. Shipping

Background

It is critical to the success of the seed that it is shipped immediately following drying, together with the completed field data forms. The collection Team Lead should ship the seed directly to Mason State Nursery, unless otherwise instructed by the State Coordinator. In some cases, the collection Team Lead may need to send the seed first to the State Coordinator, who will then send the seeds in bulk to Mason State Nursery. Do not mail seeds on Thursday or Friday so that they are not left in an uncontrolled (i.e., hot or humid) shipping center for a prolonged period over the weekend. Always check the estimated delivery date before mailing to make sure the seed will arrive before the weekend. If no one is available to receive mail over the weekend, the seeds may end up sitting for two days (or longer) in a boiling hot mailbox or on a doorstep in the direct sun.

Packaging

As often as possible, ship each seed collection in one bag. Make sure that the seed bags are clearly labeled with your unique collection number and state collection zone. The field data form must be shipped with the corresponding collection. Tape or staple it to the bag, or put it inside the bag. As an additional precaution, place a second label on top of the seed inside the bag. We recommend shipping in a sturdy cardboard box, such as a USPS Priority Mail Medium Flat Rate Box. These boxes can be used to ship seed anywhere in the U.S. (with tracking) for a low flat rate, regardless of weight – if it fits, it ships! Boxes can be ordered online at the USPS Postal Store (<https://www.usps.com/>) or picked up at any USPS Post Office, free of charge. The labeled paper bags should be securely packaged for shipping (i.e., taped at the seams and padded with newspaper or loose bubble wrap inside the box). Woven PVC or nylon air freight envelopes can be used for smaller quantities of seed. Please do not use any non-breathable bags or

containers for seeds as this may contribute to mold growth. If shipping multiple associated boxes at the same time, please include a note for MSN staff letting them know, as all boxes may not arrive on the same day.

Shipping via USPS

To ship the seed, first log in to the project USPS account at www.usps.com (contact State Coordinator, Collection Team Lead, or Pollinator Partnership for login credentials). From the homepage, select “Mail & Ship” and then “Click-N-Ship.” From there, you will be able to fill out the shipping label using the following steps:

1. Where are you sending from?

You will need to edit the “Return Address” to reflect your own address, as the default address is the Pollinator Partnership headquarters in San Francisco.

2. Where are you sending to?

Unless instructed otherwise by your State Coordinator, all seed must be shipped to the following address:

**Holly Frainer
IDNR, Mason State Nursery
17855 County Road 2400 E
Topeka, Illinois 61567**

Under “Additional Actions,” check the box indicating “I would like to get tracking notification” so that Pollinator Partnership can be updated on the status of the package.

3. Enter a shipping date

Select same day shipping to ensure the seed is delivered ASAP.

4. Enter package details

Select “I am Shipping Flat Rate”

5. Enter package value

Leave this field blank.

6. Select a service type

Select “Priority Mail” under “Choose a Service Type.” Once all other fields are complete, you can click “View available Services and Prices” at the bottom. Then, select the option for “Priority Mail® Medium Flat Rate Box.” Be sure to check the scheduled delivery date to ensure it falls before the weekend. Depending on the amount of seed collected, feel free to use a larger or smaller box or envelope, but note that the price will change depending on package size.

7. Add insurance and extra services

Do not change anything in this category. Leave all fields set to the default options.

8. Label Summary

Review the label summary to ensure the address and delivery date are correct, then click “Add to Cart.”

9. Shipping Cart

Once again, review the order to ensure all the information is correct, then select “Next: Billing Information.”

10. Billing Information

Check the box indicating “*I certify that my mailing complies with...” Select “Use PayPal,” and click “Next: Pay and Print.”

11. Printing the label

Now that you have paid for the postage, you can print the label. The label should be securely taped to the top of the box.

12. Mailing

Once the seed has been securely packaged in a USPS box and postage has been added, you can either hand deliver the package to any USPS Post Office, or you can schedule a pickup with your daily mail pickup (your office might have an outgoing mail receptacle which a postal worker takes from during your daily mail delivery). Regardless of how the package is received by the USPS, you want to make sure: 1) it is received by a postal worker on the same day, and 2) it is never left in an uncontrolled or hot or humid environment.

Please contact your State Coordinator or info@pollinator.org to confirm when seed has been shipped. If you have any questions or concerns regarding the delivery of the package, please contact Holly Frainer, Project Wingspan Plant Technician at Mason State Nursery, at 309-535-2185 or hf@pollinator.org.

**Appendix A:
Target Plant Species
Plant Profiles**

Appendix A: Target Plant Species Plant Profiles

Project Wingspan Target Plants for Seed Collection		Bloom Period											
Latin (Botanical) Name	Common Name	J	F	M	A	M	J	J	A	S	O	N	D
<i>Zizia aurea</i>	golden Alexanders				X	X	X						
<i>Tradescantia ohiensis</i>	Ohio spiderwort				X	X	X	X					
<i>Geranium maculatum</i>	wild geranium				X	X	X	X					
<i>Lupinus perennis</i>	wild lupine					X	X						
<i>Penstemon digitalis</i>	foxglove beardtongue					X	X	X					
<i>Echinacea pallida</i>	pale purple coneflower						X	X					
<i>Asclepias syriaca</i>	common milkweed						X	X	X				
<i>Asclepias exaltata</i>	poke milkweed						X	X	X				
<i>Echinacea purpurea</i>	purple coneflower						X	X	X				
<i>Senna marilandica</i>	Maryland senna						X	X	X				
<i>Verbena stricta</i>	hoary vervain						X	X	X				
<i>Asclepias incarnata</i>	swamp milkweed						X	X	X	X			
<i>Asclepias tuberosa</i>	butterfly weed						X	X	X	X			
<i>Asclepias verticillata</i>	whorled milkweed						X	X	X	X			
<i>Chamaecrista fasciculata</i>	partridge pea						X	X	X	X			
<i>Heliopsis helianthoides</i>	oxeye sunflower						X	X	X	X			
<i>Oenothera biennis</i>	common evening primrose						X	X	X	X			
<i>Pycnanthemum tenuifolium</i>	narrowleaf mountainmint						X	X	X	X			
<i>Pycnanthemum virginianum</i>	Virginia mountain mint						X	X	X	X			
<i>Ratibida pinnata</i>	yellow coneflower						X	X	X	X			
<i>Rudbeckia hirta</i>	black eyed Susan						X	X	X	X			
<i>Veronicastrum virginicum</i>	Culver's root						X	X	X	X			
<i>Verbena hastata</i>	blue vervain						X	X	X	X			
<i>Impatiens capensis</i>	jewelweed							X	X	X			
<i>Eupatorium perfoliatum</i>	common boneset							X	X	X			
<i>Euthamia graminifolia</i>	grass-leaved goldenrod							X	X	X			
<i>Eutrochium maculatum</i>	spotted Joe-pye weed							X	X	X			
<i>Eutrochium purpureum</i>	sweet joe pye weed							X	X	X			
<i>Liatris pycnostachya</i>	prairie blazing star							X	X	X			
<i>Liatris spicata</i>	dense blazing star							X	X	X			
<i>Monarda fistulosa</i>	wild bergamot							X	X	X			
<i>Coreopsis tripteris</i>	tall coreopsis							X	X	X	X		
<i>Helenium autumnale</i>	sneeze weed							X	X	X	X		
<i>Liatris aspera</i>	tall blazing star							X	X	X	X		
<i>Vernonia gigantea</i>	giant ironweed							X	X	X	X		
<i>Oligoneuron rigidum</i>	stiff goldenrod								X	X	X		
<i>Symphotrichum laeve</i>	smooth blue aster								X	X	X		
<i>Symphotrichum novae-angliae</i>	New England aster								X	X	X		

Plant profiles for Appendix A. can be found in the Download Center <https://www.pollinator.org/wingspan/seed-collection#download>

**Appendix B:
Field Data Form
(Blank and Example)**

Appendix B: Field Data Form - Blank

Project Wingspan Field Data Form

COLLECTION TEAM INFORMATION					
Seed Collection Team Reference ID:		Project Site ID:		Collection Number:	
Date(s) Collected:		Collection Time:		Number of Volunteers:	
Collector Names (Circle data collector):					
Seed Collection Zone (circle the color):	Green (north)	Orange (central or west)	Blue (south)		
SEED COLLECTION DATA:					
Scientific Name:			Common Name:		
Number of Plants Sampled:			Photograph Taken:	Y or N	
LOCATION DATA:					
State:		County:		Land Owner:	
Permission Filed:	Y or N	Survey123/GPS Data Recorded:	Y or N	Managed Area Name:	
Latitude:			Longitude:		
Directions: Provide detailed directions to the collection site. Refer to nearby landmarks, roads, and towns. Include parking information and directions from parking area to collection site.					
HABITAT DATA					
Non-Target Associated Species:				Land Use Type:	
SCOUTING INFORMATION: Target plant species in bloom but not ready for collection					
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Notes:					

Appendix B: Field Data Form - Example

Project Wingspan Field Data Form

COLLECTION TEAM INFORMATION					
Seed Collection Team Reference ID:	OH.CT1	Project Site ID:	A	Collection Number:	1
Date(s) Collected:	4-24-17	Collection Time:	12:30 pm	Number of Volunteers:	4
Collector Names (Circle data collector):	Jane Doe, Ravi Patel, Tyrone Jones, Cindy Lee				
Seed Collection Zone (circle the color):	Green (north)	Orange (central or west)	Blue (south)		
SEED COLLECTION DATA:					
Scientific Name:	Asclepias incarnata		Common Name:	Swamp milkweed	
Number of Plants Sampled:	57		Photograph Taken:	Y or N	
LOCATION DATA:					
State:	Ohio	County:	Cuyahoga	Land Owner:	Cleveland Metroparks
Permission Filed:	Y or N	Survey123/GPS Data Recorded:	Y or N	Managed Area Name:	Acacia
Latitude:	41.504442		Longitude:	-81.491285	
Directions: Provide detailed directions to the collection site. Refer to nearby landmarks, roads, and towns. Include parking information and directions from parking area to collection site.					
Headed north on I-271 toward Lyndhurst, took Brainard Rd exit. Turned right onto Cedar Rd. Turned right, into the Acacia Reservation parking lot. Found the marked trail and walked about 50 meters to the collection field, located on the left side of the trail.					
HABITAT DATA					
Non-Target Associated Species:	Unknown grasses, red clover, queen ann's lace, goldenrod, and multiflora rose.			Land Use Type:	
SCOUTING INFORMATION: Target plant species in bloom but not ready for collection					
Scientific Name:	Monarda fistulosa	Common Name:	wild bergamot	Approx. Number of Plants Present:	35
Scientific Name:	Coreopsis tripteris	Common Name:	tall coreopsis	Approx. Number of Plants Present:	58
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Scientific Name:		Common Name:		Approx. Number of Plants Present:	
Notes:					

**Appendix C:
Collection Team
Reference Numbers**

Appendix C: Collection Team Reference Numbers

Collection Team reference ID by State		
Team #	Illinois	Indiana
1	IL.CT1	IN.CT1
2	IL.CT2	IN.CT2
3	IL.CT3	IN.CT3
4	IL.CT4	IN.CT4
5	IL.CT5	IN.CT5
6	IL.CT6	IN.CT6
7	IL.CT7	IN.CT7
8	IL.CT8	IN.CT8
9	IL.CT9	IN.CT9
10	IL.CT10	IN.CT10
11	IL.CT11	IN.CT11
12	IL.CT12	IN.CT12

**Appendix D:
Sample Right of Entry Permit
and Notification Documents**

Appendix D: Sample Right of Entry Permit and Notification Documents

(Insert Name of Private Landowner)

(Insert Date)

(Insert Address of Private Landowner)

Dear (Insert Name of Private Landowner):

The Pollinator Partnership and its affiliates require employees and volunteers to obtain written permission from landowners in certain cases before entering onto private property to conduct plant surveys, seed collections, and seed/plug planting. Consequently, we are hereby requesting your signature below to confirm your approval for Pollinator Partnership employees or volunteers to enter your land for the purpose described below. (the "Purpose"). The data and/or seed collected will be used for enhancing monarch butterfly and rusty patched bumble bee habitat via Project Wingspan, and details about the work conducted will be provided to you upon request.

Specific information regarding this request is as follows:

1. (proposed date and time of entry and departure, or period of time during which recurring visits will be necessary).
2. (kind and number of vehicles to be used)
3. (number of persons in party)
4. (name, email address, and phone number of State Coordinator or Team Lead).
5. (purpose of the work)
6. (locations on the property where work is to be done).

Pollinator Partnership agrees to hold the Landowner identified above harmless from any and all actual damages, liabilities, claims, losses, and costs arising from the entry of Pollinator Partnership's employees or volunteers upon Landowner's property for the Purpose, other than those arising from Landowner's willful misconduct or gross negligence.

If you have any questions about Project Wingspan, you may contact (insert name of State Coordinator) at the following telephone number: (insert telephone number)

Please indicate your consent to this request by signing below and (list method return, e.g., envelope provided, leave at designated location, etc.). Thank you for your cooperation.

Sincerely,

_____ Date:

Requestor Signature

_____ Date: -

Requestor Name

I approve of the entry of Pollinator Partnership employees and volunteers upon the Property identified above, for the Purpose described herein.

_____ Date:

Landowner Signature

_____ Date:

Landowner Name

Appendix D. Sample Right of Entry Permit and Notification Document- Oral

Documentation of Oral Permission to Access Private Lands

The (Name of State Coordinator) Obtained oral permission to access private lands as follows:

Description of the work and/or project title, to include date and time of entry and departure or anticipated duration of the work if recurring visits will be made:

Address of Property:

Printed name and address of the landowner contacted:

The landowner was provided with the following information:

1. (proposed date and time of entry and departure, or period of time during which recurring visits will be necessary).
2. (kind and number of vehicles to be used).
3. (number of people in the party).
4. (name, email address, and phone number of chief of party).
5. (purpose of the work).
6. (locations on the property where work is to be done).

Date permission was granted:

Name and signature of State Coordinator who obtained permission:

Other persons in the party who witnessed the oral permission (as applicable):

The documentation of an oral agreement should be retained in the project file by the initiating office until the project is completed.

**Appendix E:
Volunteer Waiver/
Hold Harmless Document**

Appendix E. Pollinator Partnership Volunteer Waiver/ Hold Harmless Document

Name of Volunteer (please print): _____

Effective Date: ___/___/_____

Address: _____

Phone Number: (____) ____-_____

Name of Volunteer Activity: _____

Check here if Volunteer is under age 18:

I, the above listed Volunteer, desire to work as a volunteer for Pollinator Partnership "The Organization" and engage in the activities related to being a volunteer for Project Wingspan.

I hereby voluntarily execute this Volunteer Waiver under the following terms:

I, the Volunteer, release and hold harmless the Organization and its successors and assigns (the "Organization Releases") from any liability, claims, and demands of whatever kind or nature, either in law or equity, which arise or may hereafter arise from my volunteer work with the Organization.

I understand that this Waiver discharges the Organization Releases from any liability or claim that I, the Volunteer, may have against the Organization with respect to bodily injury, personal injury, illness, death, or property damage that may result from my participation in connection with the Volunteer Activity defined above. I also fully understand that the Organization does not assume any responsibility for or obligation to provide financial assistance or other assistance, including but not limited to medical, health or disability insurance, in the event of injury, illness, death, or property damage.

I, the Volunteer, understand that I expressly waive any such claim for compensation or liability on the part of the Organization beyond what may be offered freely by the representative of the Organization in the event of such injury or medical expense.

I hereby release the Organization Releases from any claim whatsoever which arises or may arise in the future on account of any first aid treatment or other medical services that are conducted in connection with an emergency during the Volunteer Activity.

I understand that my participation in the Volunteer Activity may include various activities that may be hazardous to me and I hereby expressly and specifically assume the risk of

injury or harm in these activities and release the Organization Releases from all liability for injury, illness, death, or property damage resulting from my participation in the Volunteer Activity.

I grant unto the Organization all right, title, and interest in and the unlimited right to use any and all photographic images and video or audio recordings including my name or image (collectively, "My Likeness") that are made by, or shared with, the Organization during my work in connection with the Volunteer Activity, including, but not limited to, any royalties, proceeds, or other benefits that are derived from such photographs or recordings.

I expressly agree that this waiver is intended to be as broad an inclusive as permitted by the laws of the State of _____ in the United States of America, and that this Waiver shall be governed by and interpreted in accordance with the laws of the State of _____. I agree that in the event that any clause or provision of this Waiver shall be held to be invalid by any court of competent jurisdiction, the invalidity of such clause or provision shall not otherwise affect the remaining provisions of this Release which shall continue to be enforceable

Volunteer's Signature

Print Volunteer's Name

If under 18:

Signature of Parent/ Guardian

___/___/___
Date

Printed Name of Parent/ Guardian

Emergency Contact:
Name: _____

Relationship to Participant: _____

Phone Number: _____

VOLUNTEERS MUST COMPLETE THE WAIVER AND RELEASE FORM
PARENT/LEGAL GUARDIAN SIGNATURE IS REQUIRED IF VOLUNTEER IS UNDER
AGE 18

**Appendix F:
Seed Collecting Techniques-
Quick Reference**

Appendix F. Seed Collection Techniques- Quick Reference

Seed Collection Techniques Quick Reference

Adapted from the Bureau of Land Management Seeds of Success Program

	What to do...	Why?
1.	Assess the target population and confirm that a sufficient number of individual plants (minimum of 50) have seeds at natural dispersal stage.	To ensure that adequate genetic diversity can be sampled from the population, and that the seeds are likely to be at maximum possible viability and longevity.
2.	Carefully examine a small, representative sample of seeds using a cut test and for smaller seeds a hand lens.	Estimate the frequency of empty or damaged seeds and confirm that the majority of seeds are mature and fully formed.
3.	Collect mature, dry seeds into double-bagged brown paper bags. Large collections can be made using plastic buckets and then transferred into bags.	Ensures the highest possible viability at collection and maximizes the potential storage life at the Mason State.
4.	If seeds can be liberated from their fruits quickly and easily, by shaking the open fruits over a container, carry this out and note it on the field data form.	Maximizes the use of available field time and allows for seeds to be cleaned and prepared once dried.
5.	Sample equally and randomly across the extent of the population, maintaining a record of the number of individuals sampled.	Capture the widest possible genetic diversity from the plant population sampled.
6.	Collect no more than 20% of the viable seed available on the day of collection.	Ensure that the sampled population is not over collected and is maintainable.
7.	For each collection, estimate the viable seed production per fruit, per individual and per population, and note these on the field data form	Document species seed biology and better assess the influence of collecting on the population.
8.	Clearly label all bags with your name, date, collection zone and Latin name. If there are multiple bags, label 1 of 3, 2 of 3, etc.	To ensure that this unique identifier is attached to each sample of a collection. All other data will be recorded on the field data form.

Appendix G:
Survey123 GIS Application Instructions

Appendix G. Project Wingspan Seed Collection Report Survey123 GIS Application Instructions

Introduction:

To facilitate accurate and consistent data collection during the volunteer seed collection efforts, Pollinator Partnership teamed up with the University of Arkansas Center for Advanced Spatial Technologies (CAST) to develop an innovative reporting tool. The Project Wingspan (PW) Seed Collection Survey allows users to input spatial data directly into a shared database while in the field. Registered users with a smartphone can download the free Survey123 for ArcGIS application and then install the Project Wingspan Seed Collection Tool. Completed surveys can be submitted directly into the Project Wingspan geodatabase from the field using a mobile device, or stored/saved as a draft(s) within the mobile application until a Wi-Fi or cellular connection can be re-established. The submitted data significantly improves communication among partners and can be monitored, which improves coordination and organization between the project team. The seed collection reports collected through this application may even support other pollinator research and modeling efforts for future field studies.

Purpose:

The Project Wingspan Seed Collection Tool is being used to: digitize or capture some of the information contained within the seed collection Field Data Form, provide us with an accurate location of the collection sites, create a database for field photos from each seed collection within Project Wingspan, and give us real-time progress updates on the seed collection effort. This digital survey does not replace the paper Field Data Form, but it compliments it and provides an accurate map of the spatial distribution of the Project Wingspan collection sites. This feature will be critical for the redistribution of the seed onto the landscape and ensure proper curation of the seedlings. **Paper copies of the original seed collection Field Data Forms should be mailed with the seed collected, and the original seed collection field data documents should always be maintained by the State Coordinator or Team Leader for each seed collection team.**

Users have two ways in which to access the Project Wingspan Seed Collection Report. The preferred method is to use a mobile device loaded with the **Survey123 for ArcGIS** application, OR registered users can use a desktop or mobile web browser (latest versions of Chrome, Firefox; Safari are recommended). Each user of the Project Wingspan Seed Collection Tool will require a **secure log-in and password** (a registered ArcGIS Online account managed by CAST), and each reported Seed Collection should only be completed **once, regardless of method used**.

This set of instructions will guide new or existing users through the online, digital submission of a Project Wingspan Seed Collection Report and demonstrate both methods: online web browser and using the preferred method via the **Survey123 for ArcGIS** mobile application with the Project Wingspan Seed Collection survey installed.

Appendix G. Project Wingspan Seed Collection Report Survey123 GIS Application Instructions

The use of a mobile device is recommended because a precise LOCATION is required for each submission, and most mobile devices have camera on-board so that uploading field work photos will be much easier. P2 Pro Tip: Carry a field clipboard with white paper to use as a neutral plant leaf or plant seed pod photography while in the field.

Getting Started:

As previously mentioned, the Project Wingspan Seed Collection survey form can be used within a web browser OR within a free mobile app called "Survey123 for ArcGIS". The mobile application is located within the app stores for Apple, Windows Mobile or Android devices. If you have a smart phone or **GPS* enabled tablet**, you should download the latest version of the **Survey123 for ArcGIS** application.

Field Data Reporter Requirements

State Coordinators for Project Wingspan should identify at least one person within each Seed Collection Team to serve as their designated reporter for each PW seed collection site visit. The Field Data Reporter should have a smartphone or mobile device that includes a built-in Camera and onboard GPS.

- Camera: Since a minimum of three photographs are required for each seed collection report, it will expedite the field workflow if the user's device contains a camera. It may help to practice these field photos before you head to the seed collection site. Clip boards or other items may help provide contrasting backgrounds for your flower, leaf, or seed photos. White one-centimeter gridded paper works well for some users.
- GPS: Enable Location Services within your mobile device settings to assist your field reporting of the location of each Seed Collection Report. You can also use the map to "move" or navigate the map under the "map marker" until you've precisely identified the seed collection location for the report. Enable Location Services well before you reach the seed collection site so that your GPS will be updated and ready to locate you, precisely. Confirm that your application: Survey123 for ArcGIS is ALLOWED to use your device location too. Sometimes these settings must be set manually on some devices.

Paper Field Data Forms

The paper field data forms included within PW training materials should also be completed during each field collection effort since those notes will help the designated **PW Seed Collection** Reporter upload the correct attributes (and the three required site photos) using their mobile device or desktop computer. Please maintain copies of these paper field data forms. These paper fieldwork forms can even be photographed and uploaded within each digital Seed Collection Report that's collected/submitted within the

mobile application – another way to “backup” your field notes and store them within the digital Seed Collection record that is submitted into the Project Wingspan geodatabase.

An emailed summary of each “Successfully submitted” PW Seed Collection Report will be sent to an account owners email address. Typically, those emails will arrive within 15 minutes of submission of a Seed Collection, regardless of method used to submit.

Appendix G - Part 1: For access to the PW Seed Collection Report on a Smartphone

Each State Coordinator and **designated** Field Data Recorder(s) will need to request a **Project Wingspan** user-account in order to download the PW Seed Collection Report survey. This Seed Collection Survey is not accessible without account credentials specific to Project Wingspan, but if you have an existing account from previous work with P2, such as with the MWAEBF project; then let Brian Culpepper know and you can re-use the existing account for PW. To request this username / password, please send to Brian Culpepper (brian@cast.uark.edu) with the following subject line: Project Wingspan User Account Request.

Please provide this important information within the body of the email:

- Your first/last name
- Organization you represent
- Full mailing address
- Name of your State Coordinator for Project Wingspan
- Date you anticipate field collection to begin within your area
- Phone number (cell preferred) that we can use to reach you
- **Do you have an existing ArcGIS Online Account** (in any other organization?)

Please specify the type of phone (iPhone/Windows/Android) or tablet that you plan to use for submitting your Project Wingspan Seed Collection Reports. If you plan to upload these reports from your laptop or desktop computer, it would be helpful to know this too.

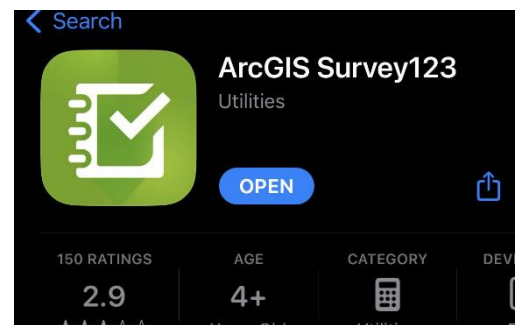
After your email request has been received, we will create your account and follow-up with your user-credentials and instructions detailing how to download the app and corresponding Project Wingspan Seed Collection survey. This download must be completed and tested by the Data Recorder volunteer prior to participation in a seed collection event. Download the Survey123 for ArcGIS application, Log-In to the application using your Project Wingspan credentials* (*these are your ArcGIS Online account credentials) and then **DOWNLOAD** the Project Wingspan Seed Collection tool to your mobile device. **Complete this while on a Wi-Fi connection and BEFORE you travel to the field!** This PW survey application is large because it contains images of plant profiles to help you in the field. It'll save you valuable time while on-site and you

should practice using the application after reviewing the training materials and well before any Seed Collection

Step 1: Download the App

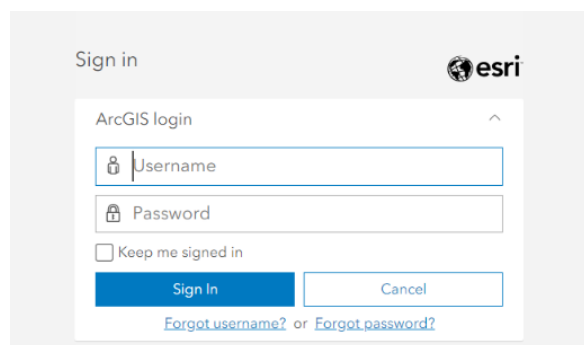
- To download the **Survey123 for ArcGIS** app on your smart phone, first navigate to the App Store. Depending upon the type of mobile phone you're using, here's where to download the app online:
 - iTunes download (Apple): <https://itunes.apple.com/us/app/survey123-for-arcgis/id993015031?mt=8>
 - Google Play download (Android): <https://play.google.com/store/apps/details?id=com.esri.survey123&hl=en>

- Search for "Survey123 for ArcGIS" so you can locate and install this (free) mobile application created by ESRI, Inc. called Survey123 for ArcGIS
- Click to install the app. You may need to log in using you Apple ID or other credentials to enable the download.



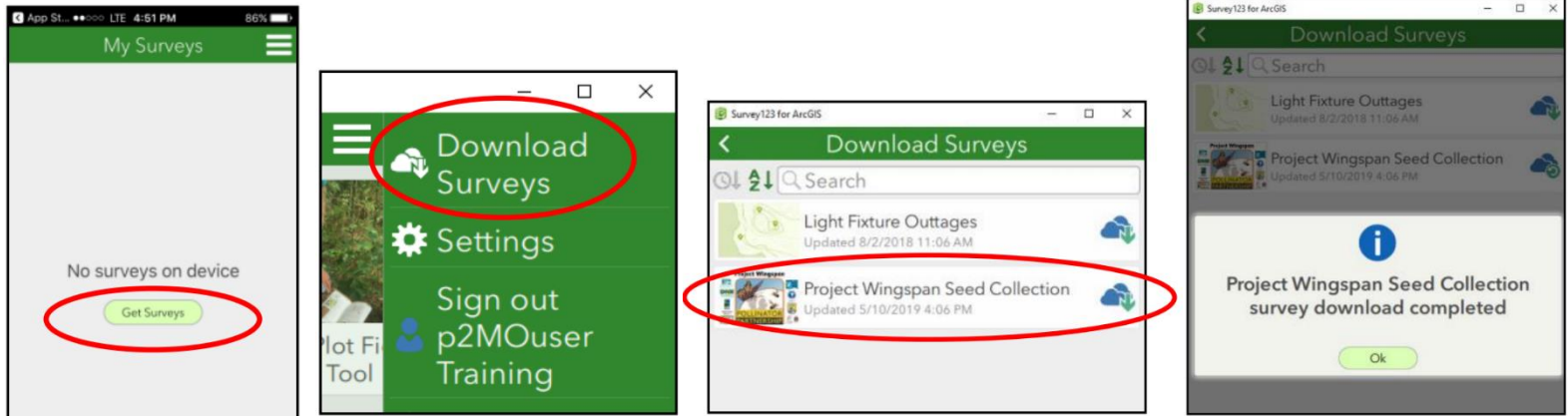
Step 2: Sign In to ArcGIS Online using you PW credentials

- After the Survey123 for ArcGIS application is installed, use your credentials to Sign-In to ArcGIS Online within the Survey123 for ArcGIS app. If you have trouble, contact your State Coordinator or Brian Culpepper (brian@cast.uark.edu) for help logging in.



Step 3: Download the Survey

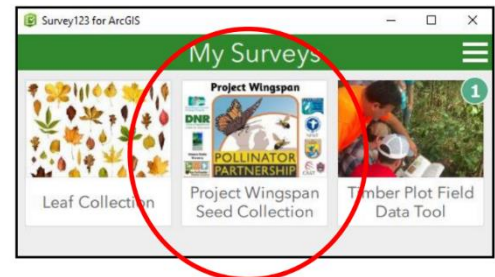
- Next, you will need to download the Project Wingspan Seed Collection survey. Click “Get Surveys” and then select “Project Wingspan Seed Collection” to download the survey. It should now display in the “My Surveys” home screen.



Step 4: Completing a Survey

1. Now that you’ve installed the app and downloaded the survey, you are all set to begin collecting data! This survey app can be used when ‘off-line’ and should work whether you have Wi-Fi / cell service or not. However, once you return to cell service or Wi-Fi, you must remember to submit those ‘draft’ survey responses so that they are successfully added to the project database.

2. To complete a seed collection report, select Project Wingspan Seed Collection on the “My Surveys” homepage to be directed to the survey



3. To begin collecting data, select the “Collect” button at the bottom of the Project Wingspan Seed Collection Tool home page.



- You may receive a pop-up box asking if you would like to allow the survey to access your location while using the app. Select “Allow” so that the app can auto-locate your point based on your phone’s GPS coordinates.



- Fill out the form starting with “Data Recorder Name”. Note that fields marked with asterisks are (*) are **required** in order to submit the survey. The only fields that are not required are “Target species in bloom”, “Permission required to access the site”, and “Site Description”.

- Refer to Section 8a of the training manual for the appropriate Collection Team and Project Site ID formats.



- Once you select the state and county in which your collection site is located, the collection zone field will auto-populate to the correct color based on the maps in Appendix J. You can use this information to fill out the Collection Zone fields on the paper Field Data Form.

State Name: *

Which State is this seed collection located?

County Name: *

Please select a county or begin typing to shorten the pick list.

Collection Zone:

The Project Wingspan Collection Zone for this county is:

State Name: *

Which State is this seed collection located?

Ohio

County Name: *

Please select a county or begin typing to shorten the pick list.

Cuyahoga

Collection Zone:

The Project Wingspan Collection Zone for this county is:

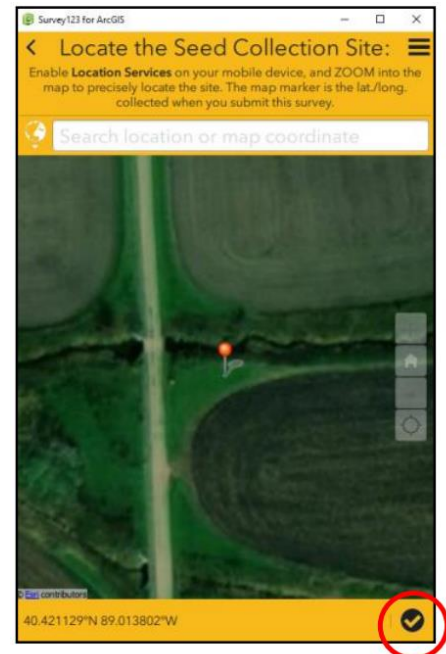
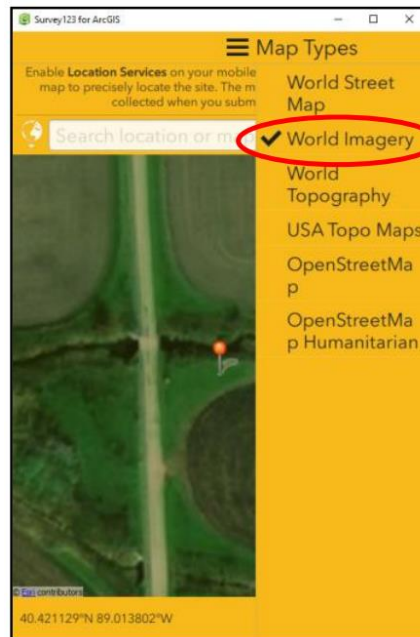
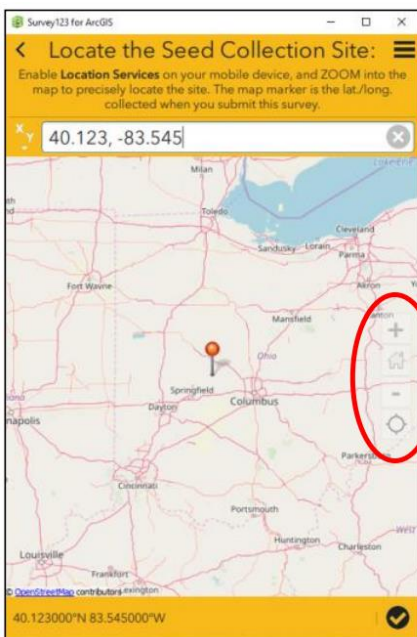
green

- Locating the collection site. To auto-locate based in your phone's location, select the bullseye at the top right corner of the map. You will need to allow the app to access your location settings when first prompted by the app, and you will need adequate satellite reception. When inside the map, you can toggle between the blue arrow and bullseye buttons below the zoom out "-" button to switch between auto-locate and manual-locate. Given the relatively low accuracy of cellphone GPS receivers, you may want to first try auto-locating your position and then manually adjust your pin to better reflect your exact position. Switching the base layer map to "World Imagery" may help you determine your exact location based on nearby features.

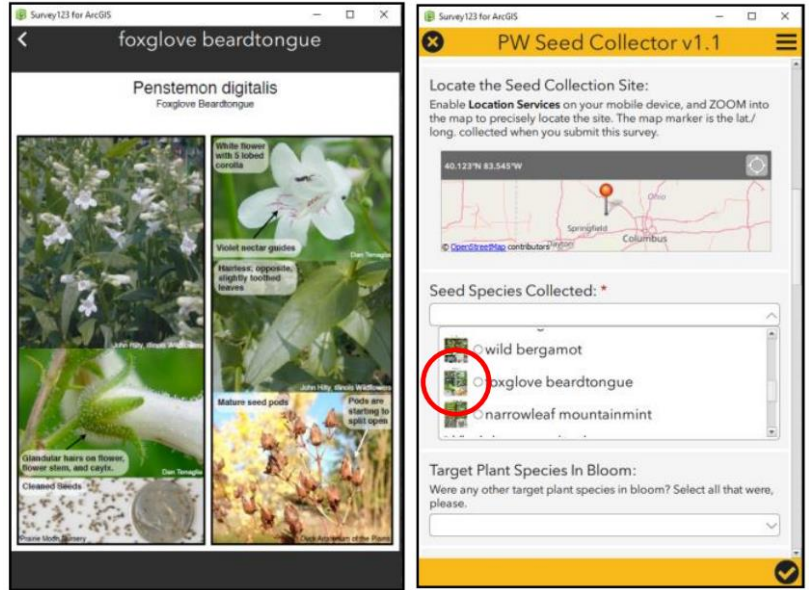


To manually locate the collection site, select the map and drag the pin to the appropriate location. You can zoom in (+) or zoom out (-) by pinching inwards or outwards with two fingers on the map or by pressing the corresponding buttons.

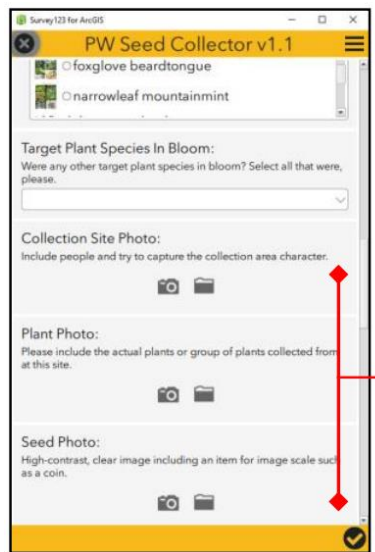
When satisfied with the position of your point, select the check mark at the bottom right of the screen to confirm your location.



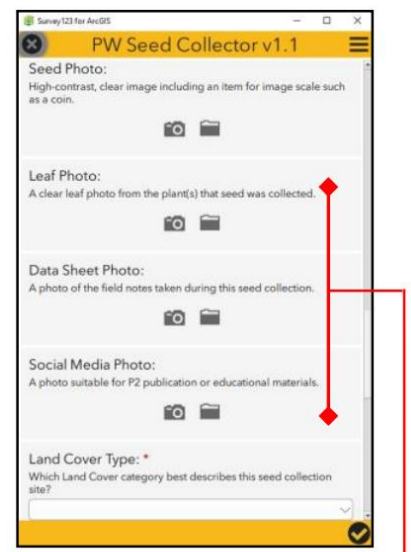
9. Select the species you will be collecting during your visit. If collecting from multiple species during a seed collection event, a separate report will need to be created for each species. To further assist with the proper identification of your target species, images from the Plant Profiles have been integrated into the application. To view the photos, click the plant image icon next to the species name within the “seed species collected” drop-down list and a larger image will appear.



10. **Photos** can be submitted in two ways. Click the camera icon and take a photo directly through the app or click the folder icon to select a photo from your saved pictures. Note that although the first three photo fields (Collection site, Plant, and Seed) do not have an asterisk (*) they are required, but the last three fields (Leaf, Data Sheet, and Social Media Photo) are optional.

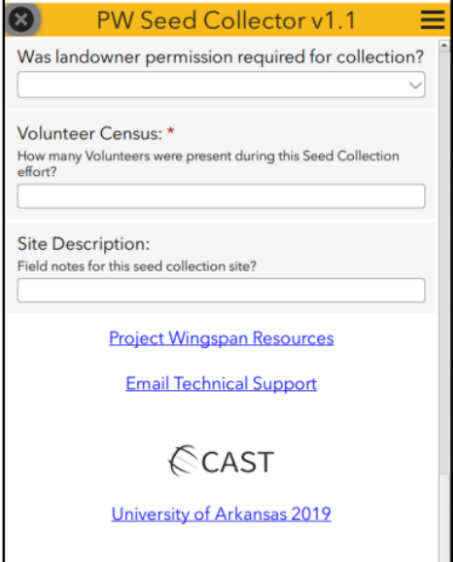


Required



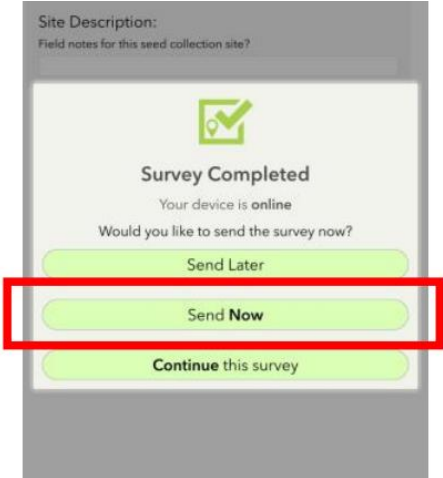
Optional

11. For additional support, you will also find a hyperlink to the Project Wingspan training homepage and an email Technical Support hyperlink at the bottom of the PW Seed Collection tool. Note: Cellular service or Wi-Fi connection is required for their use.

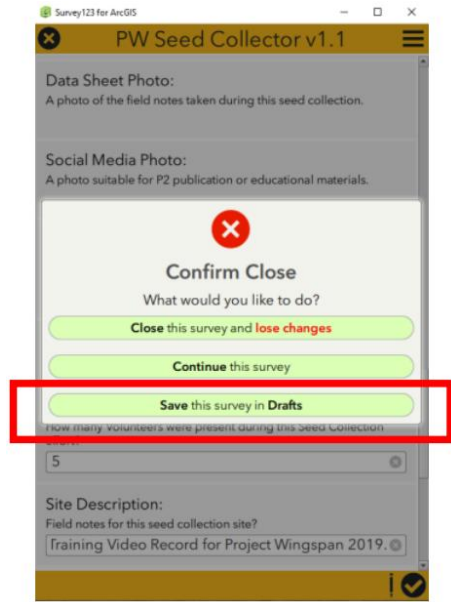


Step 5: Submitting the Survey

Before submitting your form, double check the fields to make sure everything is correct/ nothing was skipped. Make certain that each submitted report has a properly formatted **Collection Team and Project Site ID number** so that each Seed bag can be uniquely identified and processed appropriately. If all fields are complete, photos are uploaded, and you are ready to submit the report, click the check mark in the lower right-hand corner of the screen. Then select "Send Now".

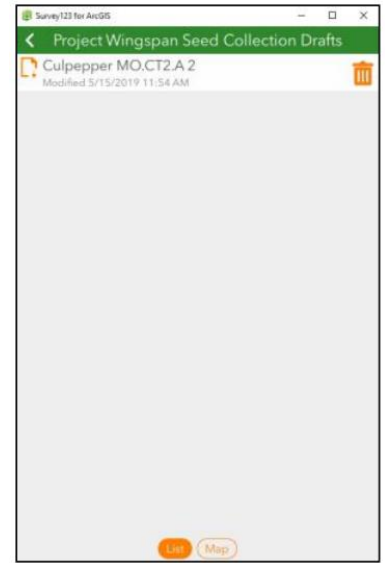


While it is encouraged to fill out the report entirely in the field using a mobile device, sometimes that may not be possible. If you are not able to complete all fields, or upload your photos due to technical difficulties or for other reasons, it may be easier to leverage the “DRAF” option available within the application. You can ‘pause’ the attribute collection at any time within the Project Wingspan Seed Collection survey by pressing the Check Box in the lower righthand corner of the form, and then selecting the “**Save this survey in Drafts**” option.



DRAFT Surveys within the Seed Collector Report orange Draft folder:

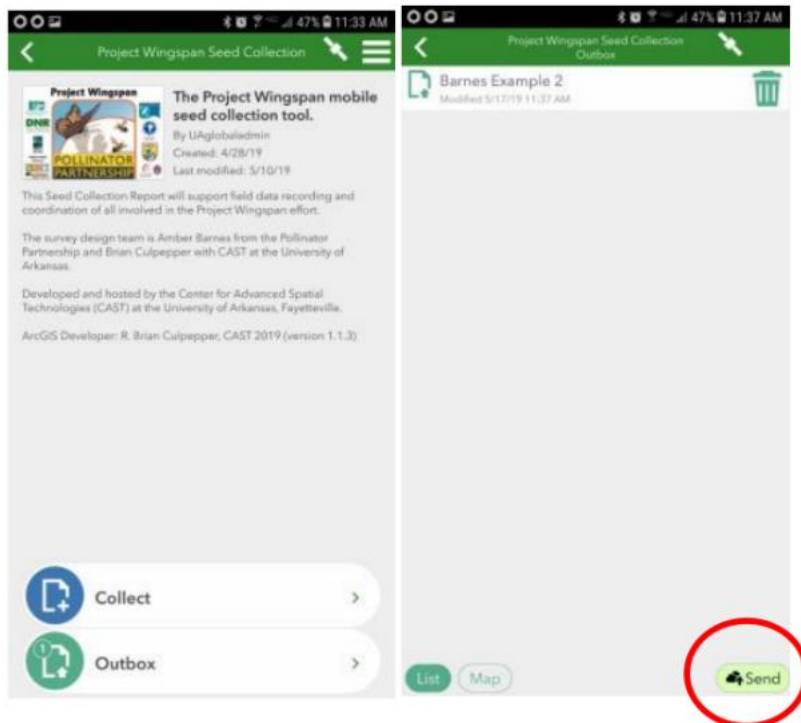
- Any reports saved as drafts will show up on the PW Seed Collection Report home screen. Click ‘Drafts’ and the following screen will show the Seed Collector Report surveys that have not been submitted.
- Each Draft survey within the Project Wingspan Seed Collection **Drafts** folder can be re-opened and completed at a later day or time. Once the PW Seed Collection Report is completed and your device is “online”, users can submit the completed report to the Project Wingspan geodatabase.



Complete surveys within the Seed Collector Report green OUTBOX folder:

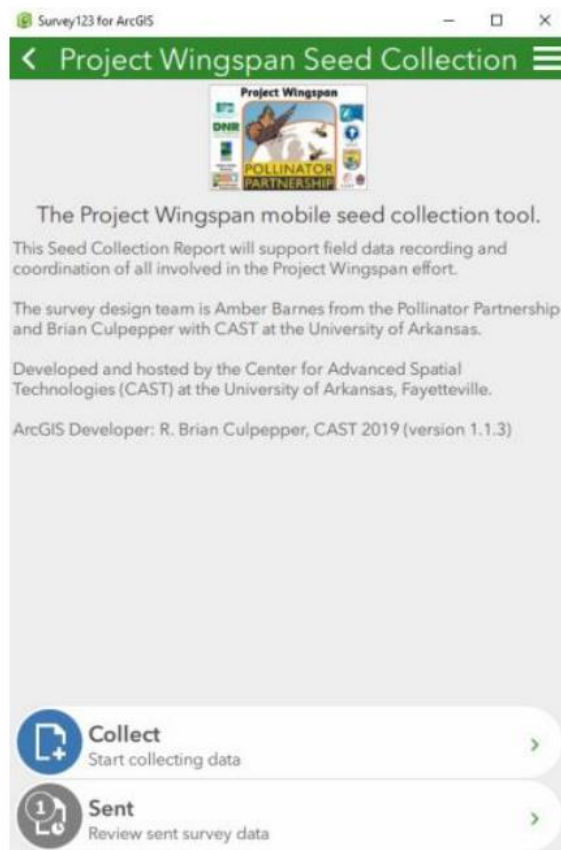
- If the survey was completed, but could not be sent while in the field, they will appear in the OUTBOX folder. **These surveys have not been successfully submitted.** Cellular service or Wi-Fi interruptions can halt a submission and cause this message to appear.

- Make sure you are still signed in and then click the Outbox button to view the unsent surveys. Click 'send' and retry until you receive satisfactory feedback within the application that your reports were successfully submitted.



A SUCCESSFULLY SENT Survey will go into the gray folder:

- The Seed Collector Report Survey's that were **SUCCESSFULLY SUBMITTED** have the **GRAY** button with a **COUNT** indication.
- You can decide to keep these locally on your mobile device or clear them from your Sent folder by clicking the bottom of the page within the Survey123 for ArcGIS application.



Appendix G – Part 2” Using the Seed Collection Report within a Web Browser (desktop/ Tablet browser):

You can also submit your Seed Collection Reports from a web browser, if desired. Although it’s best to use the Survey123 mobile application to collect/report your Seed Collection report from the field, it’s not always possible. You must have P2 seed collector Report credentials to log-in and submit and Seed Collection Reports, so review the instructions above for obtaining your PW credentials. Not all volunteers will require credentials; only volunteers that are using the Seed Collector Report applications on their mobile device or desktop web browser.

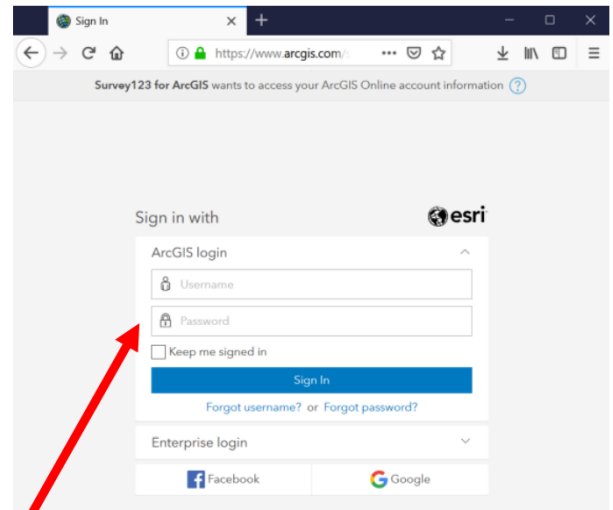
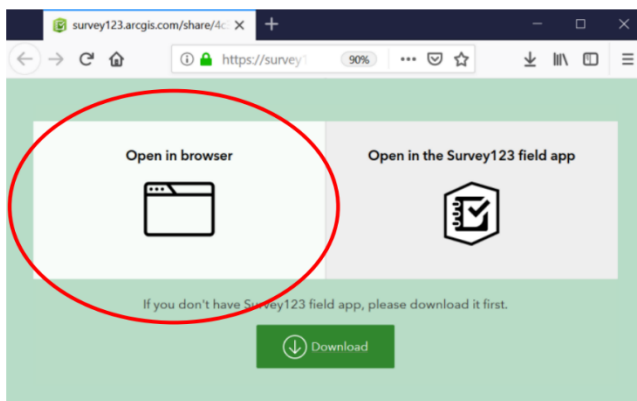
Link to desktop survey: <https://arcg.is/10ye09>

THE URL ABOVE WILL PROMPT the user to Open the survey within a web browser, or within the Survey123 for ArcGIS field application (Android, iOS, Windows).

*****if you have troubles opening this link; please contact Andy Grinstead (andy@pollinator.org) at Pollinator Partnership or Brian Culpepper (brian@cast.uark.edu) at the University of Arkansas, Fayetteville.**

The following desktop web browsers are supported (for best performance, be sure to update to the latest version):

- Chrome*
- Firefox*
- Safari*
- Edge – **not recommended but will work**
- Internet Explorer 11



Seed Collector Report – Credentials LOGIN page (Credentials are REQUIRED)

Seed Collector Report – Web Browser Form Opens (after a successful Sign-In)

PW Seed Collector v1.1

Seed Collection Details

Data Recorder Name:*
Last name only.

Collection Team and Project Site ID:*
e.g. OH.CT1.A - Please follow the Naming conventions dictated within the P2 training guide.

Please input 3-30 characters

Collection Number:*
Please enter this Seed Collection Number following the training material guidelines.

Please input a number between 1-300

Seed Collection Date:*
When did the Seed Collection occur?

Please input a date between 02/01/2017-12/31/2018

State Name:*
Which State is this seed collection located?

County Name:*
Please select a county or begin typing to shorten the pick list.

Collection Zone:
The Project Wingspan Collection Zone for this county is:

- Once you select the state and county in which you collection site is located, the collection zone field will auto-populate to the correct color, based on the maps in Appendix J. You can use this information to fill out the Collection Zone field on the paper Field Data Form.

Locate the Seed Collection Site:
Enable **Location Services** on your mobile device, and **ZOOM** into the map to precisely locate the site. The map marker is the lat./long. collected when you submit this survey.

- By clicking the “Set Location” the map view will open, and if you’re using a mobile browser, it may be able to locate you using the internal GPS of the device you are using.
- If not, then you can use a Place Name or Street address to locate your Seed Collection Site, but make sure to drag the map under the PIN so that you can precisely locate the collection site. Toggle various background base maps by clicking on the thumbnail map in the upper-right corner of the map window. An internet or cell tower connection is required.
- When scrolling down the page. Take care not to scroll over the map once your pin location is set. If you do, it will change the location of your pin, and your data will not be accurate.

Locate the Seed Collection Site:
Enable **Location Services** on your mobile device, and **ZOOM** into the map to precisely locate the site. The map marker is the lat./long. collected when you submit this survey.

Map data © OpenStreetMap contributors, CC BY-SA Powered by Esri

Lat: 40.16954 Lon: -83.84587

Altitude (m):

Seed Species Collected:*

Target Plant Species In Bloom:

Were any other target plant species in bloom? Select all that were, please.

Collection Site Photo:

Include people and try to capture the collection area character.

Press here to choose image file. (<10MB) 

Plant Photo:

Please include the actual plants or group of plants collected from at this site.

Press here to choose image file. (<10MB) 

Seed Photo:

High-contrast, clear image including an item for image scale such as a coin.

Press here to choose image file. (<10MB) 

Leaf Photo:

A clear leaf photo from the plant(s) that seed was collected.

Press here to choose image file. (<10MB) 

Data Sheet Photo:

A photo of the field notes taken during this seed collection.

Press here to choose image file. (<10MB) 

Social Media Photo:

A photo suitable for P2 publication or educational materials.

Press here to choose image file. (<10MB) 

Land Cover Type:*

Which Land Cover category best describes this seed collection site?

Was landowner permission required for collection?

Volunteer Census:*

How many Volunteers were present during this Seed Collection effort?

Please input a number between 0-100

Site Description:

Field notes for this seed collection site?

Please input 0-350 characters

[Project Wingspan Resources](#)

[Email Technical Support](#)



[University of Arkansas 2019](#)

Appendix H: Contact Information

Contact Information:

Andy Grinstead

PW Project Manager/
State Coordinator of Indiana
Pollinator Partnership
Email: andy@pollinator.org

Eleanor Schumacher

State Coordinator of Illinois
Pollinator Partnership
Email: es@pollinator.org

Kaleigh Obrock

Conservation Program Assistant
Pollinator Partnership
Email: ko@pollinator.org

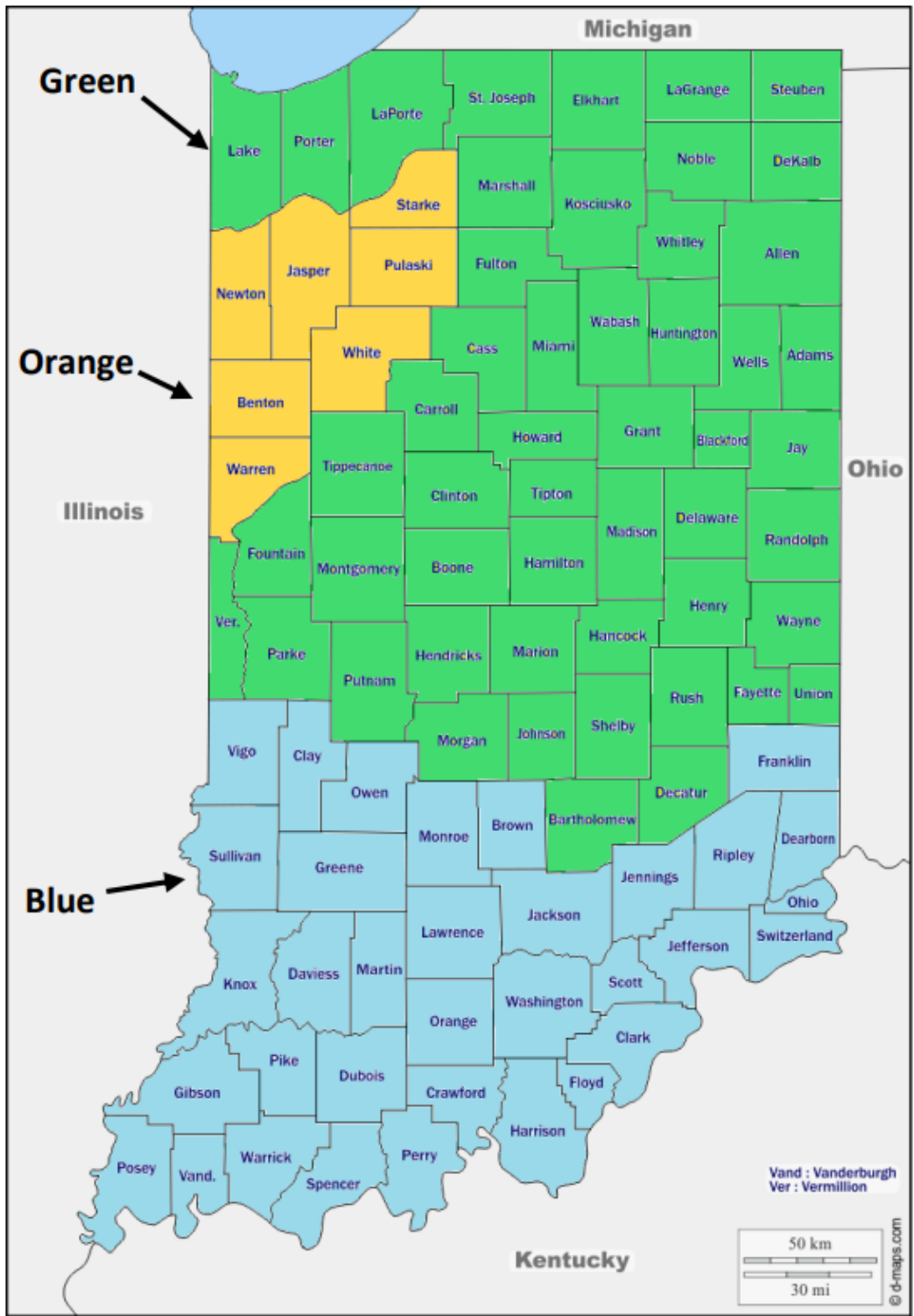
R. Brain Culpepper

GIS Research / Outreach Specialist
CAST, University of Arkansas
Email: brian@cast.uark.edu

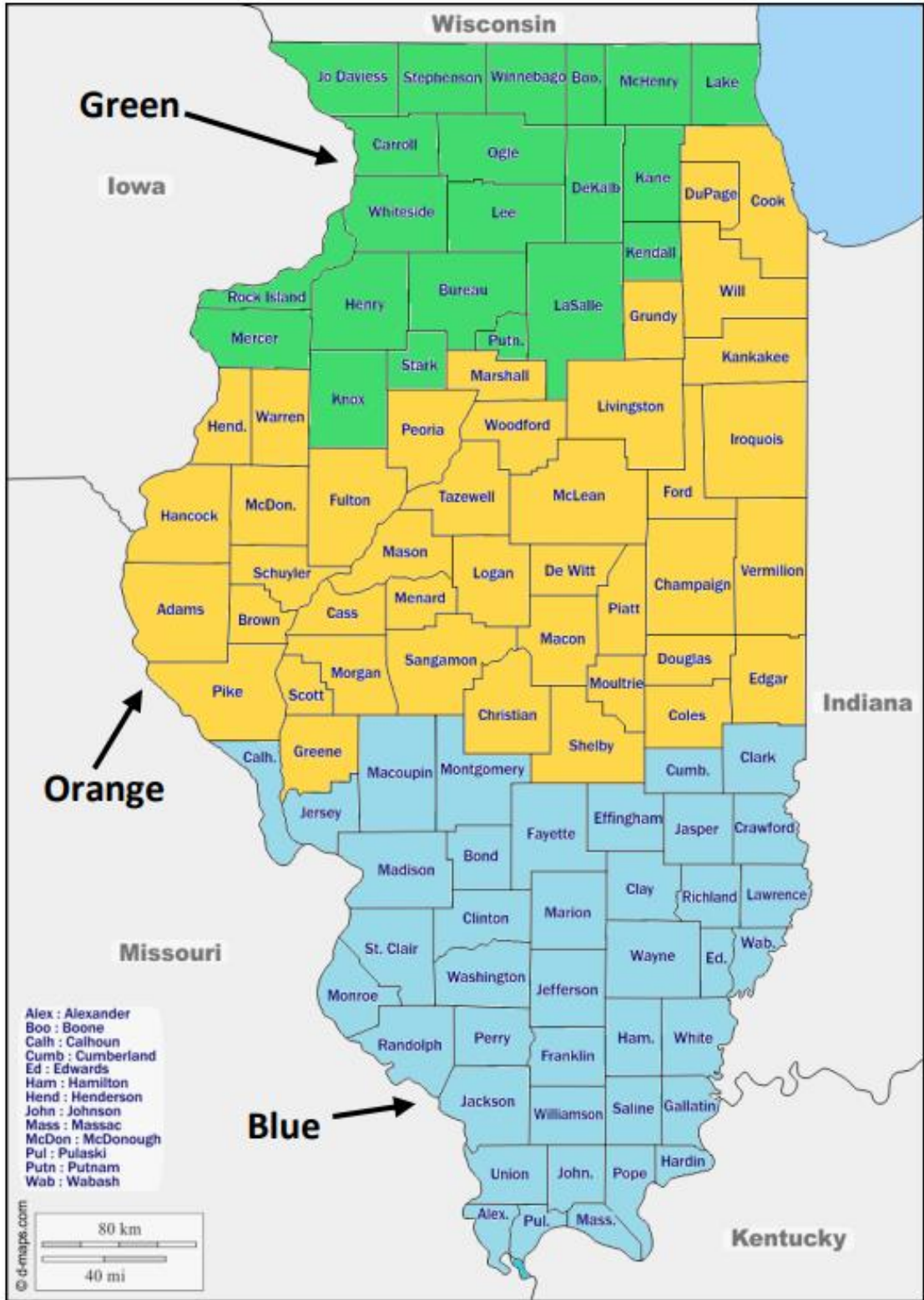
Appendix I:
Collection Tracking Sheet

Collection ID	Species (Latin name)	Common Name	Date Collected	Date Shipped

Appendix J:
Seed Collection Zone Maps



Indiana Seed Collection Zones (3 Zones)



Illinois Seed Collection Zones (3 Zones)