RAPID SITE ASSESSMENT

OPERATIONS MANUAL v3.0

Updated: 5/19/2022

Contents

Background

What is the RSA?

The Rapid Site Assessment (RSA) is a forest assessment methodology that was developed as part of the Forest Management Framework (FMF) for New York City; its central focus is characterization of ecosystem threat levels at a site to inform management actions under the FMF. The FMF is a collaborative effort by the Natural Areas Conservancy and the New York City Department of Parks & Recreation (NYC Parks) that consists of a 25-year plan to guide restoration, management, and community engagement for New York City's forested parkland; this plan includes the process, costs, steps, recommendations, best practices, and goals for forest management. The FMF is the result of six years of research, data collection, and analysis by NAC scientists, including a two-year field study conducted in forests under NYC Parks' jurisdiction, which provided the baseline forest-condition data for all calculations. Within the FMF, conducting the RSA serves as the first step in the management of a site.

Where is the RSA Conducted?

The variables focused on for the RSA are curated to those that are meaningful for the management of forested natural areas. It is not appropriate for other ecosystem types or landscaped areas.

When is the RSA Conducted?

Due to the operational focus, the RSA methodology is conducted at forested sites when a site manager determines that management intervention to reduce threats is required, but before management activities begin. Analysis of this pre-management RSA data should then be used to quantify the ecosystem threats present to inform site management plans. The RSA should then be conducted post-management to evaluate the efficacy of the activities undertaken. Although this protocol is for front-end users (land managers and field crews), the full workflow including work that is done by a data manager on the back-end is as follows:

RSA Study Design

The study area for the RSA is the site. An RSA site is a forested area at which restoration, management, maintenance, or monitoring work is required or currently ongoing. Site location and extent are determined by land managers with on-the-ground knowledge, thereby ensuring that the sites are meaningful within the scope of their work. The size and shape of sites can vary but do have minimum size requirements to ensure data integrity (**Appendix K**). In addition to limitations on size and shape, sites may be bound by fixed features such as roads, streams, trails and others. While this is not required, it is suggested because visible features ensure that the area of interest can be readily located by Assessment crews in the field.

Within a site, data are collected at observation points. An observation point (OBP) is a 10 m radius plot. The number of OBPs required for a site is based on the site size and is equivalent to three OBPs per two acres of site area. OBP centerpoint locations are randomly generated in ArcGIS to ensure unbiased data, though more than the required number are generated for each site. This is done so that if an OBP is deemed unsafe while in the field, an

additional one can be chosen on-the-fly. Due to the excess OBPs available to collectors, the protocol requires that users choose their OBPs before going out into the field.

Data collected at the OBP include estimated percent covers for all vascular plant species present, woody species seedling tallies, individual woody stem ID and measurement, impacts of invasive vines on woody species, presence of coarse woody debris, and community type identification. For a dictionary of all included variables see **Appendix A.**

Field data is collected by a team of 2-3 individuals with training in plant ID, and ideally forest management, who have received in-field training on the RSA data collection methodology. The location of both sites and OBPs are provided to data collectors via a navigable map accessible on mobile devices through the ArcGIS Field Maps application. This map provides all locational information that data collectors require to conduct fieldwork, including the required number of OBPs for a site. The map has additional functionality that allows users to save their locations in advance and navigate to them through Google and Apple maps, thereby increasing ease of navigation. Additionally, each team is equipped with a high-accuracy GPS device to enable precise OBP centerpoint navigation.

The RSA is a specialized forest assessment protocol that focuses on operationally actionable information -- specifically, variables that quantify ecosystem threats that can be reduced or eliminated. This allows the method to be less time consuming than traditional forest assessments, while still providing data output suitable for analysis.

How are the RSA Data Used?

After collection, the RSA data are primarily used to quantify ecosystem threats present within the bounds of an RSA Site. To do this, OBP data are transformed into the more standardized forestry units of stems per hectare and basal area per hectare, and then a formula applied to quantify threat levels.

Data Collection Protocol

Materials

Required	
For Data Collection Protocol ➢ Access to this protocol (either printed copy or electronic access) ➢ Mobile device (w/ ArcGIS Field Maps and Trimble Mobile Manager apps installed*) ➢ R2 device and backpack* ➢ Groundcover Species Datasheets (printed) ** ➢ Stem Count Datasheets (printed) ** ➢ List of OBPs per site ➢ Clipboard ➢ Pencil ➢ Compass ➢ Hand lens (x2) ➢ 1 x 1 m quadrat frame	➢ Chaining pin ➢ 30-meter measuring tape (x2) *** ➢ Pin flags (x12) ➢ DBH tape (cm) *** ➢ Chalk ➢ Pruners **For Unknown Species Protocol** ➢ Flagging tape ➢ Unknown Species Tracking Sheet ** ➢ 1-Gallon Ziplock Bags (one for each site) ➢ Plant Press ➢ Table of Contents for Plant Press ** ➢ Sharpie
Instructions for use located in Appendix H and J. *** All datasheets located in Appendix M.* *****Please note: all measurements taken for the RSA are in metric, so it is ideal that the measuring instruments you use are also in metric units.*	
Suggested	
➢ Insect Repellant ➢ Tecnu ➢ Plant field guides ➢ Water	➢ RSA cheat-sheet (**Appendix G**) ➢ Snacks ➢ Field notebook ➢ Binoculars

Methods

1. Review Your Sites

Once assigned, review your sites and choose the observation points that you will collect data at *before going out into the field*. See **Appendix B** for how to choose observation points.

To review your sites & select Observation Points:

➢ Open the **ArcGIS Field Maps** application on your mobile device and login with your ArcGIS Online (AGOL) account. See **Appendix H** for more info on this app.

➢ Open the RSA (DPR) Group, and then select the RSA Explorer Map. See **Appendix H** for more info on this map.

➢ Search for your RSA site on the RSA Explorer Map and save it. You can search by the RSA Site ID or the OBP ID.

▪ Site boundaries should be colored pink (To be Collected); if any on your list are colored green (Complete), blue (Data in review), or orange (Recollection) please verify with a supervisor before

conducting the RSA there.

➢ *Team leader or other responsible party*: Choose your observation points now.

  ▪ The number required is in the OBP_Points field, visible on the RSA Field map when you select the shape that represents the RSA site.

  ▪ Mark these OBPs in the markup layer, or save these the same way you save the sites. See **Appendix H** for more info in how to use the markup layer and save sites.

➢ Once you have a clear picture of where your sites are located, take some time to plan the logistics of data collection and travel (e.g. in what order you will collect the sites, site access points, vehicle parking, etc.). This is particularly important if your sites aren't close together.

➢ You are now ready to go out into the field.

2. Navigate to Your First OBP

➢ Gather all the materials required for data collection and head to your site.

➢ In the RSA Field Maps app, you can get driving directions to a site (**Appendix H**).

➢ Open the RSA Field Map on your mobile device and locate your saved sites.

➢ Using your location (indicated by a blue dot on the map), navigate to the site. Look for bounding features on the map (such as streams, roads, and trails), to help with navigation.

➢ Navigate to the center of your first OBP using the ArcGIS Field Maps App connected to your R2 satellite receiver. *See **Appendix J** for details on connecting your R2 to the Field Maps App.*
  ▪ Mark the center of the OBP by inserting a chaining pin into the ground at that location.

➢ Fill out the following fields in the General Info section of your datasheet:
  ▪ The <u>full</u> RSA Site ID (found by selecting the site boundary in the Field map)
  ▪ The <u>full</u> Observation Point ID (found by selecting the centerpoint on the RSA Field Map)
  ▪ Date
  ▪ Park Name
  ▪ Data Recorder (the person writing on the datasheet)
 ▪ Data Collectors (names or initials of all other field crew)

3. OBP Set-up

➢ Using the measuring tape and a compass, measure 10 m from the plot center in the four cardinal directions (N, S ,W ,E) AND the four intercardinal directions (NE, SE, SW, NW). The 0 m mark of the measuring tape should be at the center, and the 10 m mark should be at the edge of the OBP. At the 1m mark for the four cardinal directions, place a pin-flag. At the 10m mark for each of the eight cardinal and intercardinal

directions, place a pin-flag.

- ▪ You may also lay the measuring tapes from N to S and E to W to delineate the quadrants.

➤ See figure below for a diagram of the OBP set-up.
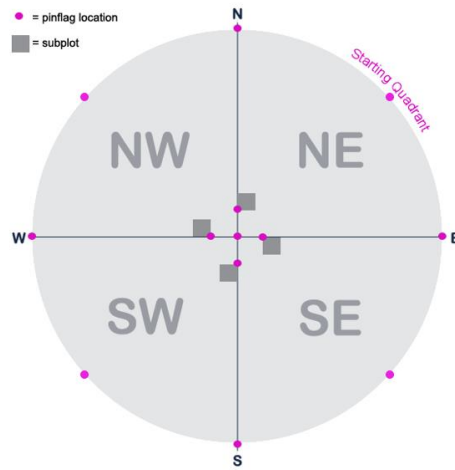
Observation Point set-up

➤ <u>NOTE</u>: Be sure to account for the curvature of the 10 m radius OBP and take care not to square off the circle when collecting midstory and overstory stem data.

4. Collect OBP Data

There will be two main datasheets on which you will collect OBP data: (1) Stem Count datasheet and (2) Groundcover Species datasheet. For species scientific names, please use the naming conventions from the USDA PLANTS Database ([link]).

➤ Before recording OBP data, write the Site ID, the OBP ID, and the date at the top of the Stem Count datasheet.

- ▪ The OBP ID is accessible by selecting the centerpoint on the RSA Field Map.

➤ Begin data collection with the **woody seedling tally**:

- ▪ Set up a 1x1 m subplot starting at the 1 m pin flag for the northeast quadrant. The flag should be at the bottom-left corner of the subplot, assuming that you are standing at the centerpoint and looking toward the edge of the OBP.
  - • In the Scientific Name column of the Stem Count datasheet, record the scientific name for the species of all woody seedlings (trees & shrubs <2 cm DBH or shorter than 1.37 m/4.5 ft) present in the subplot.
    - ○ For germinants possessing only cotyledon leaves, please record these as UNKNOWN GERMINANT.

- In the Seeding Tally column, tally the number of stems for each woody seedling species (including dead and unknown).
- Re-do the above steps moving clockwise through the remaining three quadrants' subplots.

➢ Next, collect data on the **midstory** (2-9.9 cm DBH) and **overstory** (≥10 cm DBH) woody stems:

- Begin your data collection in the northeast quadrant of the OBP.

- On the Stem Count datasheet, record the species of all midstory and overstory stems in that quadrant.
  - <u>NOTE</u>: If a species was already recorded when tallying seedlings, record the midstory and overstory tallies on the same row.
  - If a species is unknown, record as "Unknown #" and collect a sample and/or take a photo.
  - See **Appendix D** for the Unknown Species Protocol.

- Tally the number of each species (including dead & unknowns) based on their size class, using the DBH tape to determine the appropriate bin. If the DBH falls between size classes, round up or down to the nearest one (e.g. a 30.4 cm stem is assigned to the 10-30 cm bin, while a 30.5 cm stem is assigned to the 31-50 cm bin).
  - As you go along, mark each stem you've tallied using chalk. Do your best to make a mark around the circumference of the trunk at about breast height so that the mark is very visible.
  - See **Appendix C** for Special Growth Situations

- Tally stems with invasive vines touching any part of the tree in the Tally w/ Invasive Vines columns.
  - See **Appendix E** for a list of invasive vine species to account for, and additional clarification on when to count vines.

- Working clockwise, redo the above steps for the remaining three quadrants.

➢ Next, collect data on the **groundcover species**:

- On the Groundcover Species datasheet, write the scientific names of all vascular species (trees, shrubs, herbaceous plants, and vines) with foliage growing below breast height (1.37 m/4.5 ft).
  - For woody species, only include if stems have a DBH < 2 cm AND have foliage below breast height.
  - <u>NOTE</u>: If a woody species was previously recorded in the Stem Count datasheet, that species can also be included on the Groundcover datasheet, as long as it meets the requirements in the previous bullet point.
  - <u>NOTE</u>: The groundcover species data will capture all herbaceous species within each OBP, but not necessarily all shrubs, trees and vines. If, for example, a shrub or tree has a DBH < 2 cm but no foliage below breast height it will not be counted. Also, if a vine grows above breast height with no foliage growing below breast height, it will not be counted.
  - If a species is unknown, record as "Unknown #" and collect a sample or take a photo.
  - See **Appendix D** for the unknown species protocol.

- Come to a consensus on the percent cover for each species. See **Appendix F** for a visual aid in estimating percent cover.

➢ Finally, collect remaining General Info data:

- Note whether or not there is any Coarse Woody Debris (CWD) at the OBP and come to a consensus on percent cover.
  - See **Appendix F** for aids in estimating percent cover.

- The following step can be completed in the field or in the office using the datasheets for reference: Access the FIRST tool (https://tinyurl.com/NAC-FIRST) using a web browser and work through the steps to determine Community Type.
  - Please write the Community Element Global (CEGL) code clearly on the datasheet.
  - See **Appendix M** for more info on the FIRST tool.

➢ You are now ready to move on to your next OBP.

➢ Store completed datasheets in a safe, dry place, keeping all sheets for a site together. Datasheets will be entered into an online form at a later date.

Please revisit steps 1-4 for all of your assigned OBPs.

Data Entry Protocol

NOTE: Data should be entered for completed sites only. A site is considered complete when a) all required data for a site are recorded, including that for the full number of required observation points, and b) all unknown species are identified (see **Appendix D**).

Materials

Required	
➢ *Completed datasheets* ➢ *Pencil* ➢ *Scanner*	➢ *A laptop or desktop (with Survey123 installed)* ➢ *Stapler*

Methods

1.Get Situated

- ➢ Gather all your completed datasheets.

- ➢ Find a desktop or laptop computer to work on.

- ➢ Open Survey123 and sign in with your ArcGIS Online username.

- ➢ Refresh the RSA_Data_Entry survey.

    - ▪ See **Appendix I** for an overview of the Survey123 App.

- ➢ Open the RSA_Data_Entry survey.

- ➢ Gather the first set of datasheets you will enter and *check off the box on the top of the first sheet next to "Digital Data Entry Started."*

- ➢ Keep **Appendix A** (Data Definitions) handy for clarification on how to enter any of the variables into the Survey123 form.

2. Enter Your Data

- ➢ In Survey123, click "Collect" to open the survey form.

- ➢ Select the appropriate Park from the dropdown.

- ➢ Select the Site_ID for the RSA Site you are entering data for.

- ➢ Select the Observation ID from the dropdown.

- ➢ Once the above information is filled out three sections will appear:

    - ▪ <u>General Info</u>: The location to enter the data in the General Info section of your datasheet.

    - ▪ <u>Groundcover Species Data</u>: The location to enter the data in the Groundcover Species section of your datasheet.

    - ▪ <u>Stem Count Data</u>: The location to enter the data in the Stem Count section of your datasheet.

- ➢ Expand the <u>General Info</u> section and enter the appropriate data, as directed in the app.

    - ▪ Note: There are two questions at the bottom of this section that are not on the datasheet.
        - • <u>Data Entry Staff</u>: Selected from a dropdown list. The person entering the data (you!).
        - • <u>Field Group</u>: Selected from a dropdown list. The best description for the team that collected the data. *Options: Conservancy or Partner Group; CUNY Field Research Interns; NYC Parks Staff; NAC Staff; Not Listed.*
            - o The person entering the data should be on the team that collected it, so in most cases, the answer to this question is equivalent to the field group <u>you</u> are part of. *If you are not sure which option to choose, check with your supervisor.*

- ➢ Expand the <u>Groundcover Species Data</u> section to begin entering data.

    - ▪ Answer 'Yes' or 'No' when asked about species present.
        - • If no, move on to the Stem Count species section. ⊞
        - • If yes, enter the first species by clicking the '+' button in the middle of the screen.
            - o If a species is not in the dropdown menu select UNLISTED and type the name in the space provided.
                - ▫ The accepted scientific name of a species may change over time. Before selecting UNLISTED please verify that you are searching the currently accepted name by checking the USDA PLANTS Database (**Error! Hyperlink reference not valid.**).
            - o Add additional species by clicking the '+' button on the right side of the ribbon that is present under the species entry.

    - ▪ Check the box next to each line on the datasheet after you enter it. This is tedious, but necessary to keep track of what you're doing.

- ➢ Expand the <u>Stem Count Data</u> section to begin entering data.

    - ▪ Answer 'Yes' or 'No' when asked about woody species present.
        - • If no, move on to the Submit Your Form section below. ⊞
        - • If yes, enter the first species by clicking the '+' button and filling out the fields that appear.
            - o If a species is not in the dropdown menu select UNLISTED and type the name in the space provided.
                - ▫ The accepted scientific name of a species may change over time. Before selecting UNLISTED please verify that you are searching the currently accepted name by checking the USDA PLANTS Database (plants.usda.gov).

o   Check the box next to each line on the datasheet after you enter that species.
o   Add additional species by clicking the + button on the right side of the ribbon that is present under your species entry (if you accidentally hit the + button and don't need an extra record, you can delete it using the trashcan icon).

3. Submit Your Form

➢   Once you complete data entry for all sections on the RSA Data Entry form, review your entries:

▪   <u>General Info</u>: Check that all fields are filled out and match the datasheet.

▪   <u>Groundcover Species Data</u>: Check that all species were entered (the number of records shown in the app should match the number of species on the datasheet). If you missed any, add them in, if you added a wrong species, you can delete it using the trashcan icon.

▪   <u>Stem Count Data</u>: Check once more that all species were entered. If you missed any, add them in, if you added a wrong species, you can delete it using the trashcan icon.

➢   Now that you have checked the data, Submit your survey by clicking the checkmark at the bottom right of the Form screen .

➢   Once the survey is successfully submitted, return to the first page of your datasheets for the OBP and check the box on the top of the datasheet next to 'Digital Data Entry Complete'.

➢   After submitting a survey, data cannot be edited through the RSA Data Entry Form, so please take your time.

4. Scan Your Datasheets

➢   Once you have submitted your survey, scan the datasheets.

▪   Scan ALL datasheets for an RSA site into a single multi-page PDF.

▪   Name the file as [SITE_ID]_[Data Collection End Date as yyyymmdd].
   •   For example if the datasheet is for RSA site Q001_RSA0001 and data collection ended on May 5, 2020 the file would be named *Q001_RSA0001_20200505*

▪   Save the file in the appropriate folder for your team in the following Sharepoint directory:
   •   FHNR > Documents > Forest Restoration > Monitoring & Assessment > RSA > Data Collection > Datasheet Scans

Appendix A | Data Dictionary

The below data table defines all variables on the datasheet, organized by the datasheet sections. Instructions for how to enter these into the RSA data entry form in the Survey 123 app are listed below the definitions in grey.

General Info
Data in this section pertain to metadata and variables that are not species-specific.

RSA Site ID: The unique ID of the RSA Site. Formatted as [parkID]_RSA#### (e.g. Q001_RSA0009)

Form Instructions: Select from dropdown list, or searchable by last four digits (e.g. Q001_RSA0009). *Note: double and triple check that this ID is correct in the app before moving on. Some of the survey questions are curated based on this answer. This means that if you change the Site ID after filling out the rest of the data entry form, you will lose data you entered.*

Observation Point ID: The unique ID of the RSA OBP. Formatted as OBP_[parkID]_#### (e.g. OBP_Q001_0071)

Form Instructions: Select from dropdown list, or searchable by last four digits. The OBP ID chosen from the list will be the full ID formatted as OBP_[parkID]_#### (e.g. OBP_Q001_0071). The list provided to you in the dropdown is populated only with the IDs of OBPs that fall within the site entered above.

Park Name: The name of the park containing the RSA site.

Form instructions: Search by the Park ID (the first part of the Site ID), because there are occasionally multiple properties that have the same name (e.g. There are 2 parks named "Riverside").

Date: The date of data collection at the OBP.

Form instructions: Select date from calendar.

Data Recorder: The name of the person recording data on the datasheet.

Form Instructions: Select from dropdown list, or searchable by starting to type in name. If name is not listed choose *NOT LISTED* from the list and write the name in the comments section.

Data Collectors: The names or initials of field crew collecting data at an RSA site (not including the recorder).

Form instructions: Not entered into the RSA Data Entry form.

Community Type Name: The name of the ecological community type that best reflects the species composition at the OBP. Determined using the FIRST tool: https://tinyurl.com/NAC-FIRST. **See Appendix L.**

Form instructions: Search using the CEGL code, not the Community Type Name. There can be more than one community type name for the same CEGL code.

CEGL Code: The Community Element Global (CEGL) code that is associated with the dominant vegetation community at the OBP. Determined using the FIRST tool: https://tinyurl.com/NAC-FIRST. See **Appendix L**.

Form instructions: Selected from a dropdown list. Searchable by any portion of the string.

Coarse Woody Debris (CWD): The percent of the OBP covered by downed logs or branches with a diameter greater than 10 cm in diameter. Collected as ranges (defined below).

Form instructions: Select appropriate range from the scale bar.

Value	Description
0	0% of the OBP area is occupied by CWD.

<5	Less than 5% of the OBP area is occupied by CWD.
5-25	5-25% of the OBP area is occupied by CWD.
26-50	26-50% of the OBP area is occupied by CWD.
51-75	51-75% of the OBP area is occupied by CWD.
76-100	76-100% of the OBP area is occupied by CWD.
Comments: Add comments, suggested work, and notes about conditions at the OBP and surrounding area, especially information relevant to land managers and conditions not already captured by the data.	
Form instructions: Free text field. Enter comments from the datasheet in the box on the form. If comments exceed character limit, summarize the main points.	

Groundcover Species Data

Data in this section pertain to vascular plant species (herbaceous, vine, and woody species w/ DBH < 2cm) with foliage growing below breast height (1.37m/4.5ft) within the OBP boundaries. All data are collected at the OBP scale.

Scientific Name: The species or genus name of a vascular plant species present within the bounds of the OBP. This includes species with a growth habit of forb/herb, graminoid, fern, vine, subshrub, shrub, and tree. Only vegetation below breast height (1.37 m/4.5 ft) should be considered. Should not include bryophytes (e.g. mosses) or non-plant species (lichen, fungi).	
Form instructions: Searchable by any part of the string. Select UNLISTED for species that are not in the list provided, and enter the missing species in the space provided.	

Value	Description
Scientific Name	The species or genus that corresponds to the specimen in question.
Unknown (#)	Should be entered in the Scientific Name column for a specimen identification that cannot be determined in the field. NOTE: Unknown numbering should re-start at each Site. This will result in the Site x Unknown # combination being the unique identifier for the sample taken. See unknown species protocol in **Appendix D**.
Mowed Lawn	Should be entered in the Scientific Name column for any lawn areas that are within an OBP. A single Mowed Lawn entry should be entered for an OBP, even if it represents more than one species.

Percent Cover: The percent of an OBP that is covered by the species or entry in the Scientific Name column. Collected as percent ranges. For woody species, only individuals with DBH of <2 cm *and* with foliage below breast height (1.37 m/4.5 ft) should be considered. If an individual vine or herb is present both above and below breast height (e.g. a vine climbing a tree), only include the vegetative parts of the plant that are *below breast height* in the percent cover estimate for that species.	
Form instructions: Select appropriate range from the scale bar.	

Value	Description
<1	Less than 1% of the entire OBP is covered by the species recorded under Scientific Name.
1-10	Between 1 and 10% of the entire OBP is covered by the species recorded under Scientific Name.

Value	Description
11-25	Between 11 and 25% of the entire OBP is covered by the species recorded under Scientific Name.
26-50	Between 26 and 50% of the entire OBP is covered by the species recorded under Scientific Name.
51-75	Between 51 and 75% of the entire OBP is covered by the species recorded under Scientific Name.
76-100	More than 75% of the entire OBP is covered by the species recorded under Scientific Name.

Stem Count Data

Data in this section pertain to woody plants (defined as having a tree or shrub growth form in the USDA PLANTS Database (link). A handful of subshrub species may also be included where they fit these criteria (e.g. *Rosa rugosa*). Data are collected within the 10 m radius Observation Point. Individuals of a species are tallied by stem, not by tree (See **Appendix C**).

Scientific Name: The species or genus name of a tree or shrub species present within the bounds of the Observation Point.

Form instructions: Searchable by any part of the string. Select UNLISTED for species that are not in the list provided, and enter the missing species in the space provided.

Value	Description
Scientific name	The species or genus that corresponds to the specimen in question.
Dead	Should be entered in the Scientific Name column for tallies that correspond to dead stems. NOTE: Any dead stem leaning >45 degrees from the axis perpendicular to the ground is no longer considered a standing dead tree, and is not tallied.
Unknown Germinant	Should be entered in the Scientific Name column for tallies that correspond to small seedlings that are not identifiable (e.g. those with only cotyledon leaves). If this option is written on a line, the only other column that should be populated for that row is Seedling Tally, since unknown midstory and overstory stems should be assigned an Unknown #.
Unknown (#)	Should be entered in the Scientific Name column for specimen identifications that cannot be determined in the field. NOTE: Unknown numbering should re-start at each Site. This will result in the Site x Unknown # combination being the unique identifier for the sample taken. See unknown species protocol in **Appendix D**.

Seedling Tally: The tally of woody stems <2 cm in diameter at breast height (1.37 m/4.5 ft), or shorter than breast height, within the 1x1 m subplots at an OBP that corresponds to the entry in the Scientific Name field on the same row.

Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.

Midstory Tally: The tally of stems 2-9.9 cm in diameter at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field of the same row.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.
Midstory Tally w/ Invasive Vines: The tally of stems 2-9.9 cm in diameter at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field that have invasive vines touching any part of the tree. This is a subset of the Midstory Tally field. See invasive vine list in **Appendix E**. Note: If an invasive vine is touching any part of a multi-stemmed tree (even if it only touches one of the stems), ALL associated stems are tallied.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.
Overstory 10-30cm Tally: The tally of stems 10-30 cm in diameter at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field of the same row.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.
Overstory 31-50cm Tally: The tally of stems 31-50 cm in diameter at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field of the same row.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.
Overstory 51-75cm Tally: The tally of stems 51-75 cm in diameter at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field of the same row.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.
Overstory >75cm Tally: The tally of stems >75 cm in diameter at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field of the same row.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.
Overstory Tally w/ Invasive Vines: The tally of stems with diameter ≥10 cm at breast height (1.37 m/4.5 ft) at an OBP that corresponds to the entry in the Scientific Name field on the same row that have invasive vines touching any part of the tree. This is a subset of the Overstory Tally fields of all overstory size classes. See invasive vine list in **Appendix E**. Note: If an invasive vine is touching any part of a multi-stemmed tree (even if it only touches one of the stems), ALL associated stems are tallied.
Form instructions: Free number field. Count the tally marks from the datasheet and enter that number in the box on the form. If none present, enter zero.

Appendix B | Choosing Observation Points

On the RSA Field map, RSA Sites contain more Observation Points than require collection, as sites increase in size, the number of excess OBPs also increases. When you are selecting OBPs to collect data at, you should choose ones that are distributed around a site.

For example, the site below requires data collection at 15 OBPs (It is a particularly large site! Most won't be this size). If you were assigned this site, you would want to choose a distribution similar to the top photo, not the bottom:
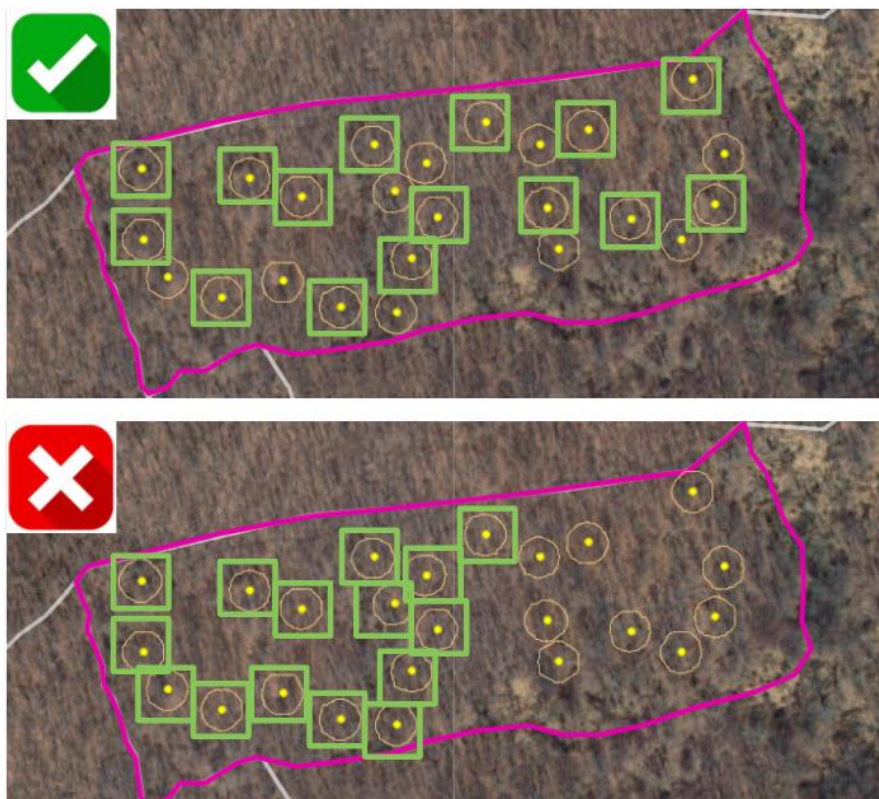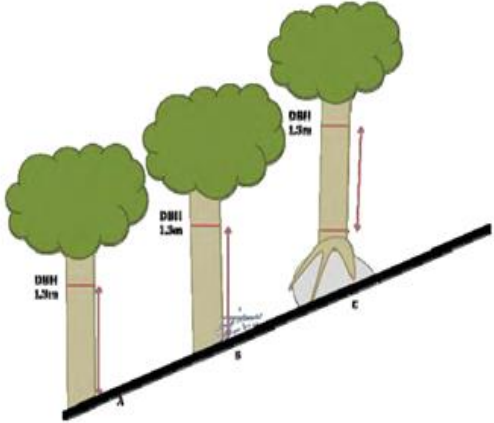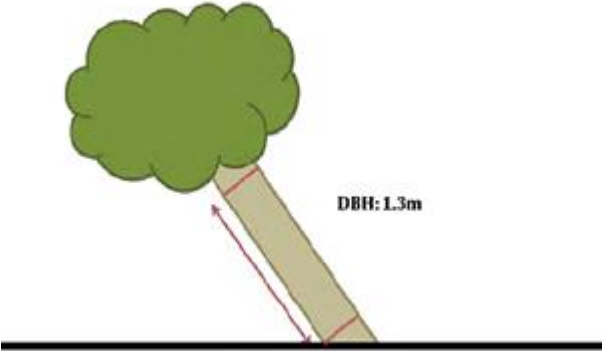
Once you choose your OBPs, save them in the ArcGIS Field Maps app and/or record the chosen OBP IDs in a field notebook or some other location that you will have access to in the field. The IDs are accessible by selecting the centerpoint of the OBP on the RSA Field Map.

As stated earlier in the protocol, you may encounter a situation in the field where you find that one of the OBPs you've preselected is not viable due to safety or access issues. If this happens, choose another OBP in the field. This is easier to visualize if you have them saved in the app, since in list form it will be that much more difficult to determine which OBPs are still eligible.

Appendix C | Special Growth Situations

The below table explains how to appropriately measure and account for stems that are growing in atypical situations. All rules apply to both midstory and overstory stems.

Ambiguous Location: If trees or shrubs are rooted on the OBP plot edge, alternate between counting the stem as "in" and "out." This method is more rapid than measuring from the plot center to the stem rooted on the edge of the OBP plot every time this case occurs.
Independent trees that grow together: if two or more independent stems have grown together at or above breast height, continue to treat them as separate trees. Estimate the diameter of each.
Trees with small irregularities at breast height: on trees with small bumps, depressions, and branches at breast height, measure the diameter immediately above the irregularity.
Missing wood or missing bark: if the tree has missing wood or bark at breast height, do not reconstruct the diameter. Record the diameter of the wood and bark that is still attached.

	Slope: when a tree is growing on a slope, measure its diameter at 1.37 m/4.5 ft from the ground along the bole on the uphill side of the tree.
	Obstruction: when materials (pile of woody material, etc.) are present beside the bole, measure 1.37 m/4.5 ft up from the base of the bole (not from the pile of materials).
	Rooted on rock: when a tree is rooted on a rock, measure the diameter at 1.37 m/4.5 ft from the root collar.
	Leaning tree: when a tree is leaning, measure the diameter at 1.37 m/4.5 ft along the underside face of the bole.
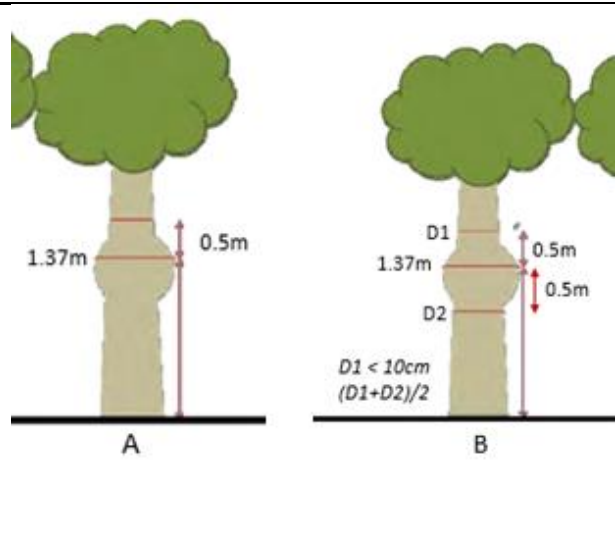
Trunk swell: if a trunk swell is present at 1.37 m/4.5 ft, measure 0.5 m above the end of the swell (Fig A). If at point of measurement the diameter is less than 10cm, record the average between the diameters 0.5 m above and below 1.37 m/4.5 ft. (Fig B)
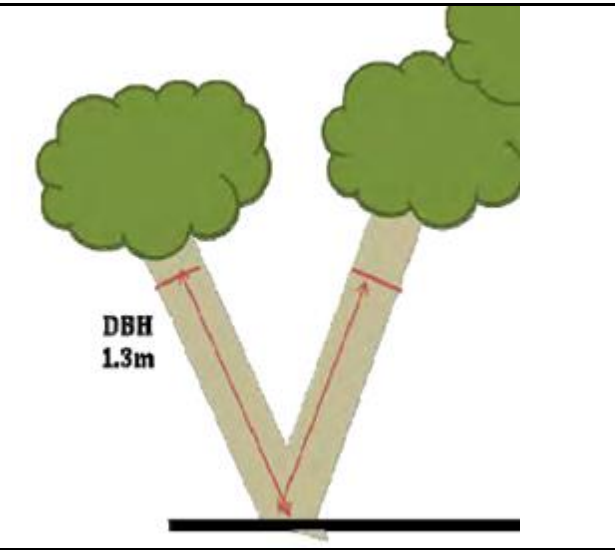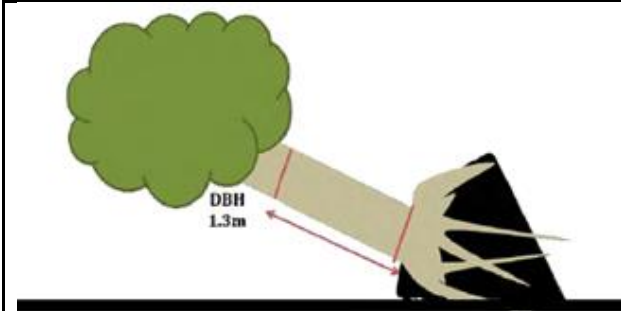

Forked trees: Treat stems and forks the same. If a tree forks below breast height and each fork branches out from the main stem at an angle of 45 degrees or less, measure each at 1.37 m/4.5 ft.
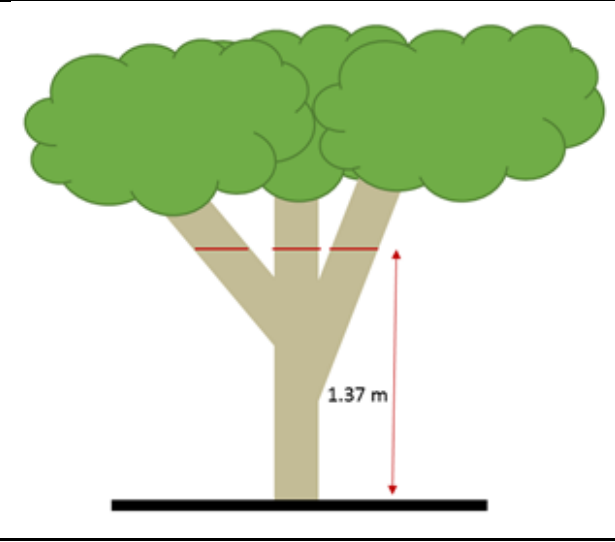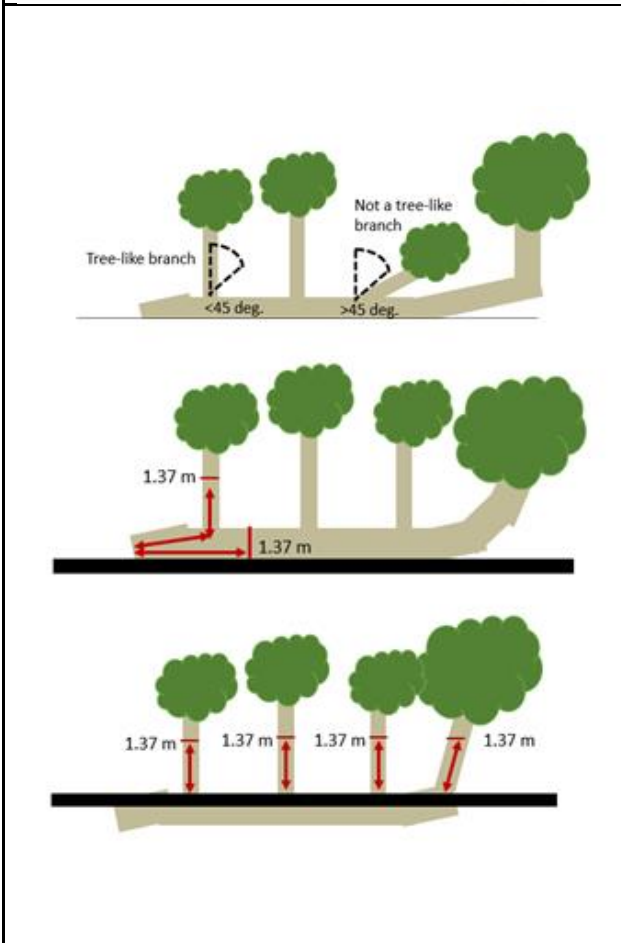

Multiple forks: it is possible for a tree to have multiple forks if they all originate from approximately the same point on the stem. If the fork occurs below 1.37 m/4.5 ft, measure the diameter on each stem at 1.37 m/4.5 ft. This will be tallied as 3 three individual stems.
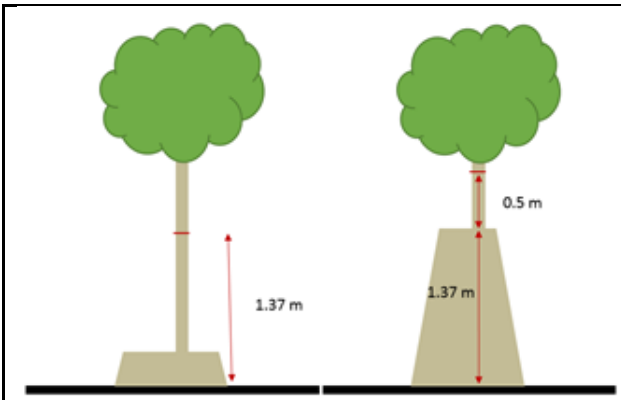
	Stump sprouts: stump sprouts grow on the boles of trees that have died or been cut. They are measured at 1.37 m/4.5 ft. If the sprout originates at 1.37 m/4.5 ft, measure the diameter 0.5 m above the origin of the sprout. If there are forked stump sprouts, use the rules described for forked trees.
	Live windthrown tree: a live windthrown tree must be touching the ground. Measure from the top of the root collar along the length to 1.37 m/4.5 ft.
	Tree-like branches coming off a downed tree: downed trees may have vertical, tree-like branches coming off the main bole. To be considered a "tree-like branch," branches must be less than 45 degrees from the vertical axis to the ground coming off the main bole (Fig 8A). · If the main bole of the tree is touching the ground, the pith of the main bole is above the leaf litter layer, and the tree is alive, this tree is considered a live windthrown tree. Use forking rules described above (left, top figure) · For any live downed trees with tree-like branches at or below breast height, measure the diameter of each tree 1.37 m/4.5 ft from the root collar of the main bole (left, middle figure). · If the pith of the main bole is below the litter layer at 1.37 m/4.5 ft: from the root collar, treat each as a separate tree regardless of where along the main stem it originates. Measure 1.37 m/4.5 ft from the ground (as opposed to from the root collar of the main bole) (left, bottom figure).

Appendix D | Unknown Species Protocol

When you encounter a species in the field that you cannot identify, don't spend a lot of time trying to ID it in the field. Instead, follow the below steps:

➢ **Record**

- Record any plant you cannot identify as "Unknown #" on the paper datasheet.

- Number unknowns in consecutive order ("Unknown 1," "Unknown 2," "Unknown 3" etc.).

A note on unknown numbering: Numbering of unknowns should restart at every site, with each number referring to a distinct species; it should be continuous throughout the entire site (<u>not</u> restarting for each Observation Point). If the same unknown species is found in the groundcover data below breast height and also in the stem count data, the same number should be entered in both datasheets. Additionally, if the same unknown is found at <u>multiple Observation Points</u>, within a single site, that unknown number would be the same for each Observation Point within that site. For example, let's say yesterday you found and collected an unknown species you recorded as "Unknown 3" at OBP Q015_0144 which is in the site Q015_RSA0006. Today you found that same unknown species at OBP Q015_0057, which is also in site Q015_RSA0006. That unknown species should be recorded as "Unknown 3" in the datasheet, and you don't need to collect a new unknown specimen.

➢ **Photograph**

- Take photos of the whole plant (if possible) and distinctive features to document growth habit, habitat, and key characters (flowers, seeds, leaves, leaf arrangement, etc.). Take the time and effort to take clear photos.
  - Photos are especially important when plants are not growing abundantly on site.
  - You can upload photos to iNaturalist, a citizen-science project that crowd-sources species identification and biodiversity data.

- To keep track of photos, it is a good idea to come up with a numbering or identification system that allows you to associate the photo with the Unknown specimen. This photo number can be written on the Unknown Species Tracking Sheet under Description for recordkeeping, so you can reference it later. Photos should be uploaded to a site-specific folder located here (link) at the end of every field day.

➢ **Collect (for abundant species only)**

- Have a plastic bag ready that is labeled with the transect ID; this will be where you store the specimens before they are pressed.
  - One-gallon ziplock bags are preferable, one per transect to prevent mix-ups between transects.

- When a species is growing abundantly in a site, collect a single, whole individual (if possible).
  - It is preferable to select an individual that is flowering or fruiting.

- Collect the entire plant when possible, including the roots (typically for small, herbaceous plants).

- Label the specimen by marking a piece of flagging tape ("Unknown #") and wrapping it around the plant.

- To prevent wilting, immediately place the specimen in the labeled plastic bag.
  Keep in mind that long-term storage of specimens in plastic bags causes rotting. All specimens from a site should go into the same labeled bag. If you have no time that day to press or ID your specimens, place the bags in the refrigerator (not freezer!). This will buy you a couple of days.

➢ **Describe**

- On the Unknown Species Tracking Sheet (**Appendix M**) describe the following:
  - Habitat (upland, wetland, etc.)
  - Growth habit (shrub, vine, forb, grass, etc.)
  - Leaf characteristics:
    - Color
    - Texture (waxy, smooth, sparsely/densely hairy, etc.)
    - Arrangement (opposite, alternate, sub-opposite)
    - Margin
    - Base and apex shape
    - Scent
  - Flowers (if present), including info on:
    - Inflorescence type
    - Floral structure (number of petals, sepals)
    - Color
      NOTE: It is always preferable to identify species that are flowering since some taxa are extremely difficult to identify when reproductive structures are absent.
  - Fruit characteristics:
    - Type
    - Color
    - Texture
  - For woody species, note bark characteristics:
    - Color
    - Texture
    - Presence of lenticels
  - Any additional features

➢ **Press**

- Dedicate time at the end of field days to preserve plants in your plant press. This can be done later in the week, but specimens will need to be refrigerated
  - Instructional materials for how to construct a plant press and how to press plants can be found here:
    https://www.floridamuseum.ufl.edu/herbarium/voucher.htm

    https://www.youtube.com/watch?v=vpOybD-67GE

- Shake out any soil from the root systems.

- Lay the plant on your newspaper, showing both sides of the leaves.
  - If the specimen is too large, select the best material for identification purposes, or fold the plant to fit the press.

- Always include flowers and fruit when possible.

- Label the page with the RSA Site ID and the Unknown #.
    - Including this info on the page is very important, as this is how we will look up the unknown and update it to the correct species once it is identified.
    - You can write the RSA Site ID and Unknown # directly on the newspaper (sharpie or pen is recommended for visibility) or put a blank label of any sort on the page and write it there.

- Before closing the press, ensure the plant is sandwiched between two newspaper sheets and include corrugated cardboard to assist with drying the specimens. Use blotters for plants with a lot of moisture content.

- Tighten straps on the plant press to compress the plants.

- List each unknown specimen on your plant press table of contents (**Appendix M**), which should be attached to the front of your plant press.

➢ **Identify**

- Dedicate in-office time to go back and identify your unknown specimens.

- Once you determine the correct species identification enter it in the following locations:
    - On the Plant Press Table of Contents under Final Species Identification.
    - On the appropriate Groundcover Species or Stem Count datasheet(s), next to the Unknown # it was previously identified by.

- To make the process go more smoothly, update the datasheets at the end of a plant ID session, using the information you filled in on the Plant Press Table of Contents.

- After identifying a species, you can remove the specimen from the plant press and dispose of it. That way only unidentified specimens remain.

Appendix E | Invasive Vines Protocol

When collecting tallies of overstory or midstory stems with invasive vines, follow these guidelines:

➢ Tally if one of the invasive vine **species listed below** is touching the stem or any tree structures associated with that stem (leaves, branches, etc) at <u>any point</u>.

➢ Your tally should represent a count of stems with vines, not a count of vines on a stem.

➢ Stems with vines should be tallied in the appropriate size class column, as well as the Tally w/ Vines column
  • e.g. if a 20 cm DBH Quercus rubra has an invasive vine, a tally mark would be entered under 10-30 cm and under Overstory Tally w/ Invasive Vines.

➢ Special Case: If an invasive vine is touching any part of a multi-stemmed tree (even if it only touches one of the stems), ALL associated stems are tallied.

<u>Vine Species Taken Into Account</u>

USDA Code	Scientific Name	Common Name
AKQU	*Akebia quinata*	chocolate vine
AMBR7	*Ampelopsis brevipedunculata*	porcelain berry
CEOR7	*Celastrus orbiculatus*	Oriental bittersweet
COAR4	*Convolvulus arvensis*	field bindweed
EUFO5	*Euonymus fortunei*	wintercreeper
HEHE	*Hedera helix*	English ivy
HUJA	*Humulus japonicus*	Japanese hops
LOJA	*Lonicera japonica*	Japanese honeysuckle
PATR6	*Parthenocissus tricuspidata*	Boston ivy
POPE10	*Polygonum perfoliatum*	mile-a-minute
ROMU	*Rosa multiflora*	multiflora rose
RULA	*Rubus laciniatus*	cutleaf blackberry
SODU	*Solanum dulcamara*	climbing nightshade
VIMI2	*Vinca minor*	Common Periwinkle
WIFL	*Wisteria floribunda*	Japanese wisteria
WISI	*Wisteria sinensis*	Chinese wisteria

Appendix F | Estimating Percent Cover

Several variables are collected as percent cover ranges (e.g. 1-10%) for the RSA, which can be a little tricky to estimate. To aid you in estimations, the below chart provides examples of what different percent covers look like.

Percent Cover Chart:
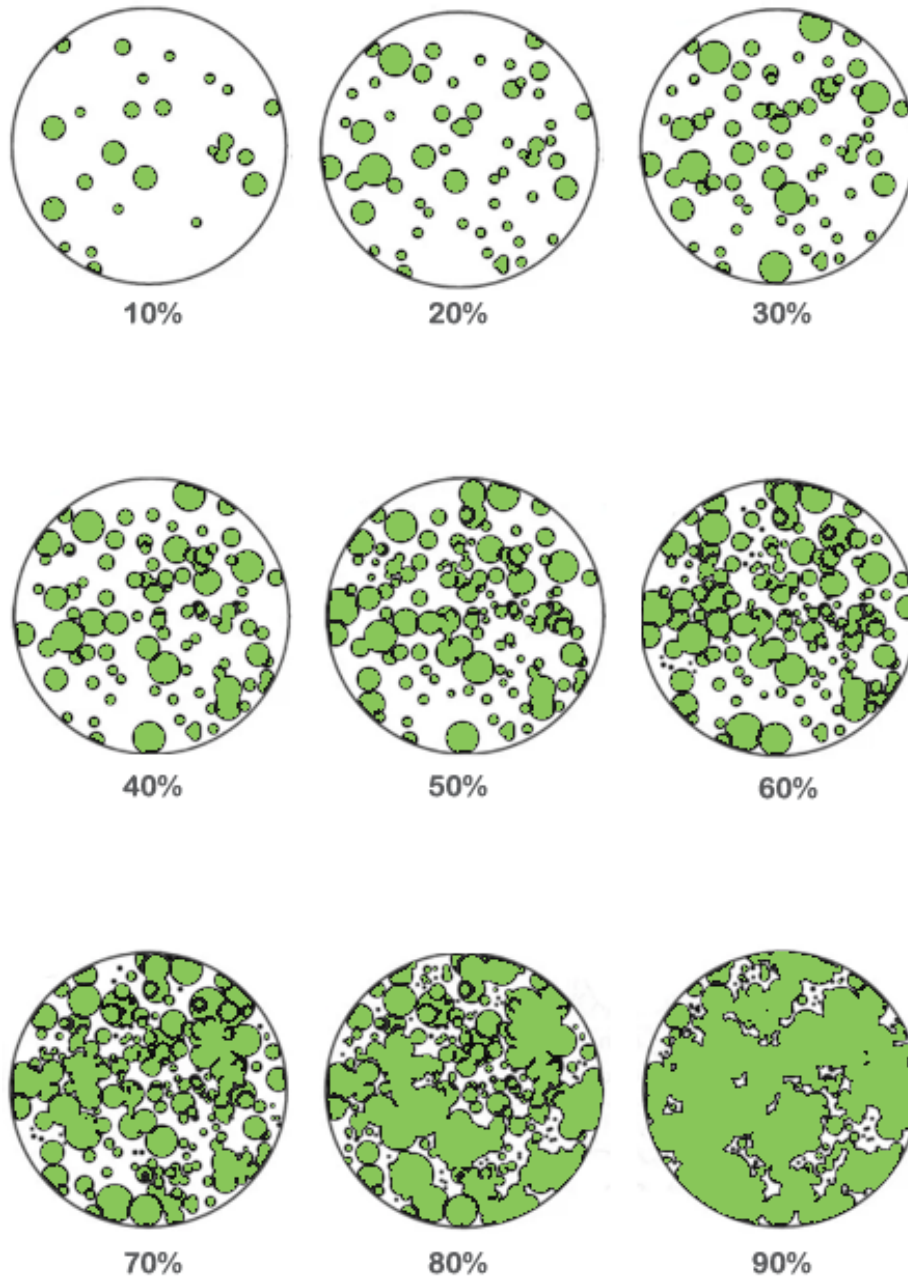
Appendix G | RSA Cheat Sheet

General Info

Site_ID: The ENTIRE Site ID as given, formatted as ParkID_RSA[Site#] (e.g. B071_RSA0001).
OBP ID: The unique ID of the RSA OBP. Formatted as OBP_[parkID]_#### (e.g. OBP_Q001_0071).
Park Name: The name of the park. Usually the name on the park sign (e.g. Pelham Bay).
Date: Date of data collection at this OBP.
Data Recorder: This is the person writing on the datasheet.
Data Collectors: The initials of the field crew who are NOT the recorder.
Coarse Woody Debris: CWD refers to logs, branches with a diameter *greater than 10 cm in diameter*
Comments: Any comments about the Observation Point. Include things that would be useful for managers to know, but that isn't captured in the rest of the data (e.g. A LOT of deer evidence, an encampment, a rare tree species that isn't in the observation point, etc).

Groundcover Species Data

Scientific Name: Please write the scientific name of the species! If you don't know it off the top of your head, please add it to the sheet ASAP. Naming conventions should be taken from the USDA PLANTS Database. Common names aren't unique and result in confusion when datasheets are revisited.
Percent Cover: Discuss with your teammates and reach consensus before choosing the most appropriate percent cover bin.

Stem Count Data

Site_ID: The ENTIRE Site ID as given, formatted as ParkID_RSA[Site#] (e.g. B071_RSA0001).
OBP ID: The unique ID of the RSA OBP. Formatted as OBP_[parkID]_#### (e.g. OBP_Q001_0071) **Date**: Date of data collection at this OBP.
Scientific Name: Please write the scientific name of the species! If you don't know it off the top of your head, please add it to the sheet asap. Common names aren't unique and result in confusion when datasheets are revisited.
Seedling Tally: The tally of stems <2cm of the specified species. Lots of the smaller seedlings will be hard to identify, so if you can't figure out what it is, list them as Unknown Germinant.
Midstory Tally: The tally of all stems 2-9.9cm in DBH of the specified species.
Midstory w/ Invasive Vines: The tally of midstory stems with invasive vines. This should describe a subset of the total midstory stems, and not be a separate tally (e.g. if you find a stem with a vine, a tally mark should go in both columns). The list of invasive vines to consider is below.
Overstory Tallies: The tally of all stems in an overstory size class of the specified species.
Overstory w/ Invasive Vines: The tally of overstory stems (from all overstory size classes) with invasive vines. This should describe a subset of the total overstory stems, and not be a separate tally (e.g. if you find a stem with a vine, a tally mark should go in both columns). The list of invasive vines to consider is below.

Unknown Species Protocol

1. Record any unknown plant as "Unknown #".
   - Unknown numbering should be consistent within a site. Numbering should NOT be restarted at each OBP within a site. Numbering SHOULD be restarted at each new SITE.
2. Take photo of whole plant including distinctive features (flowers, leaves, seeds, etc).
3. If species is abundant, collect entire specimen, choosing one with flowers and/or fruits if possible, and including roots if possible.
4. Tie flagging tape marked with unknown number to specimen, and place in one-gallon ziploc bag.
5. Describe in detail on unknown species tracking sheet. Include habitat, growth habit, leaf characteristics, flower characteristics (if applicable), fruit characteristics (if applicable), bark characteristics (if applicable) and any other features.
6. Press as soon as possible or keep in the refrigerator.
7. Identify and update on unknown species tracking sheet and in appropriate place on stem count and/or groundcover species datasheet.

Invasive Vines

Akebia quinata (chocolate vine) ***** *Ampelopsis brevipedunculata* (porcelain berry) ***** *Celastrus orbiculatus* (Oriental bittersweet) ***** *Convolvulus arvensis* (field bindweed) ***** *Euonymus fortunei* (winter creeper) ***** *Hedera helix* (English ivy) ***** *Humulus japonicus* (Japanese hops) ***** *Lonicera japonica* (Japanese honeysuckle) ***** *Parthenocissus tricuspidata* (Boston ivy) ***** *Polygonum perfoliatum* (mile-a-minute) ***** *Rosa multiflora* (multiflora rose) ***** *Rubus laciniatus* (cutleaf blackberry) ***** *Solanum dulcamara* (climbing nightshade) ***** *Vinca minor* (Common Periwinkle) ***** *Wisteria floribunda* (Japanese wisteria) ***** *Wisteria sinensis* (Chinese wisteria).

Appendix H | ArcGIS Field Maps

The RSA FieldMap is a map of all RSA Sites and associated Observation Points. It is accessed through the ArcGIS Field Maps application, available for download on all mobile devices. This map will be used by data collectors to locate their sites and observation points in the field.

<u>Signing in</u>

App access screen. Tap "Sign in with ArcGIS Online" to sign in.
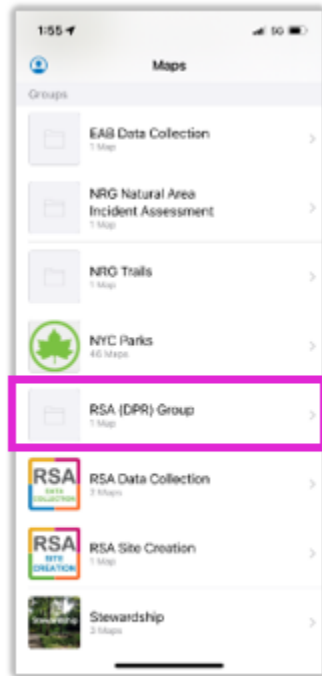
Tap "Continue"

Enter your AGOL info

Accessing the RSA Field Map

Select RSA (DPR) Group

Select RSA Explorer Map

The first screen you'll see is a map showing site locations

Map Layers & Symbology

	Yellow/Orange Dots: Represent the centerpoint of the OBP.
	
	Yellow Circles: Represent the 10m radius in relation to the centerpoint. Data has NOT been collected here.
	
	Orange Circles: Represent the 10m radius in relation to the centerpoint. Data has been collected here. If resurveying an RSA, data should be collected in these OBPs.
	
	Gray Dashed Lines: Trails.
	
	Polygons:
	  ➤ **Pink** polygons (like the one to the left), represent RSA Sites that require data collection.
	  ➤ **Green** polygons represent RSA Sites for which data has been collected.
	  ➤ **Blue** polygons represent RSA sites for which data has been collected, but the data has not been accepted yet.
	  ➤ **Orange** polygons represent sites that have already had data collection, but require a second round.

Finding Your Study Area
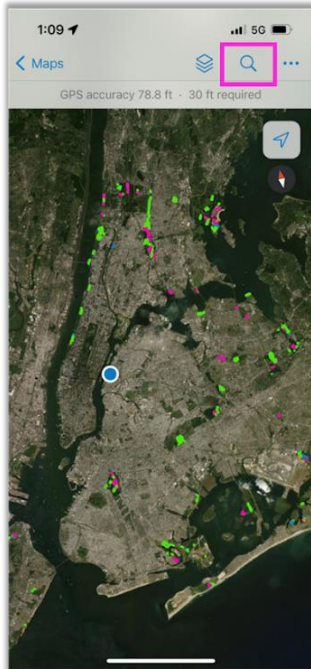
Search for site or OBP by selecting the magnifying glass icon
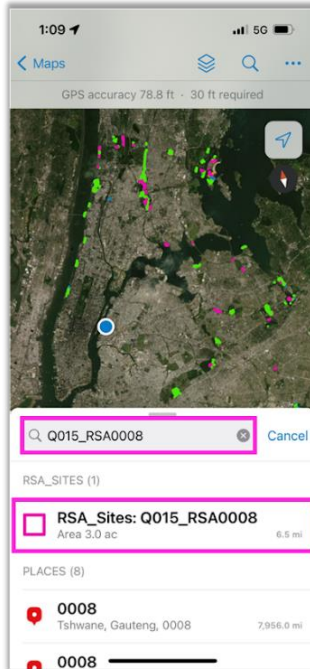
Search for your site and select
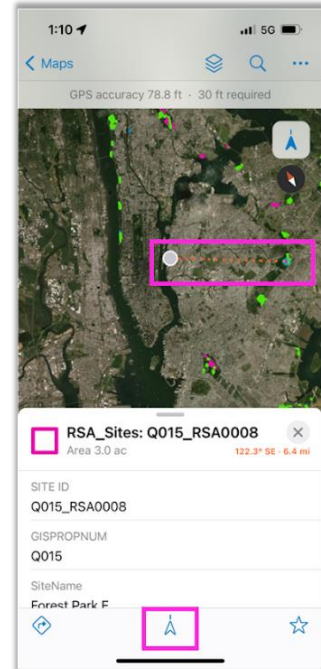
Selected site will be highlighted on map. Select navigation icon for help finding your site if you do not see it highlighted

Saving Locations
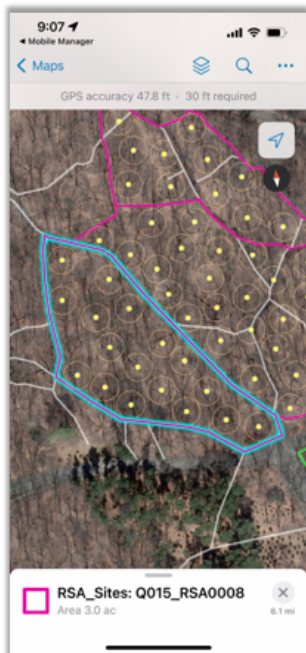
Select a site you want to be able to find later
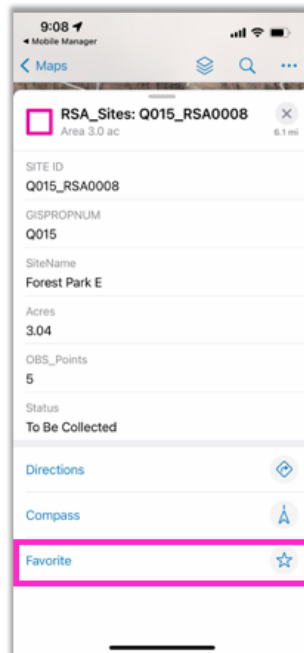
If you scroll to the bottom of the information panel you will see an option to Favorite
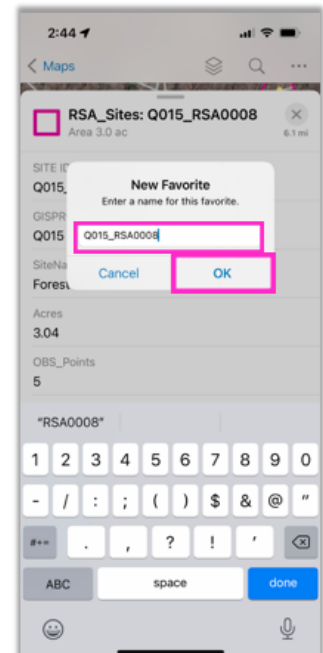
Type in the Site ID as the name for your New Favorite and click OK

Accessing and Navigating to your Saved Locations
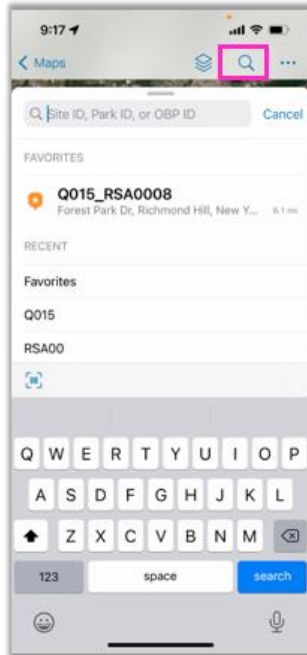
Select the magnifying glass and
your favorites should pop up
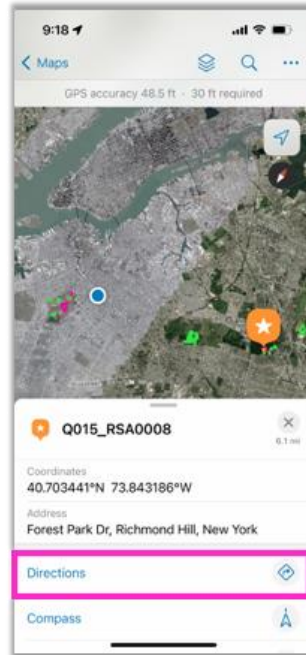
When you select your site a
screen will pop up with options.
Select Directions
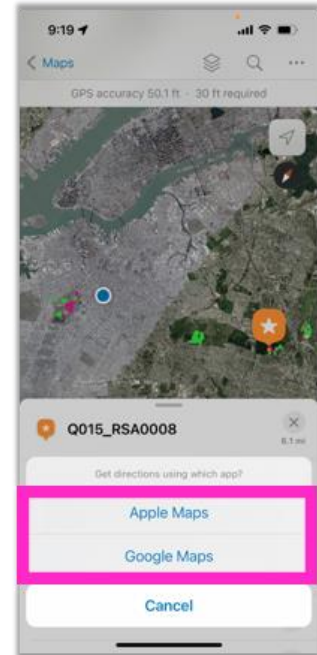
The Directions button provides
links to Apple Maps and Google
Maps

When you select one from the list,
the location is imported and
directions provided to the location

Once you arrive at your site, you can begin navigating to the center of your first OBP. To do so, you will need to connect to your R2 Satellite to get a more accurate GPS location. Details on connecting to the R2 are provided in **Appendix J**.

Using Markup Layer

The markup layer is an editable layer that is saved locally on your device. Markers can be added, or features can be drawn freehand in this layer, which makes it a useful tool for keeping tabs on your data collection progress.

Before you go into the field, it is recommended that you mark each OBP at which you plan on collecting data. As you complete data collection at each OBP, you can mark it again to keep track of your progress.

When you have picked a site, you will need to choose which observation points you will collect.

If you select the outer edge of the site, this selection pane will pop up. Select your site

A pane will pop up with information about the site.
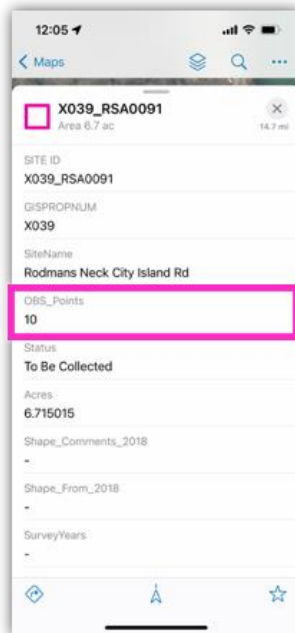
Under OBS_Points, you will find the number of observation points you will need to collect at the site.
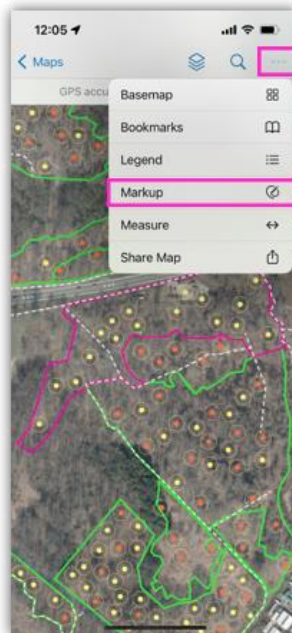
To mark the OBPs you choose, select the ellipses icon in the upper right hand corner and click Markup.

While in Markup mode you can draw a line through the OBPs you choose.
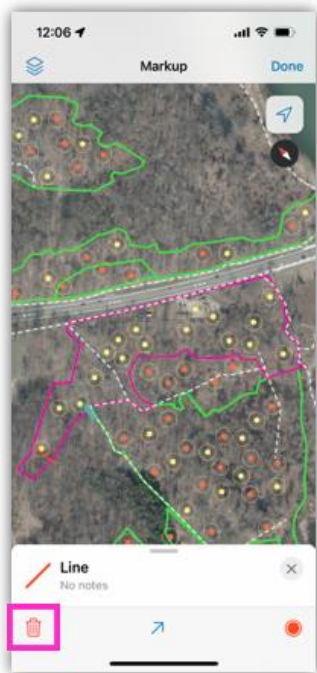
If you make a mistake you can delete by selecting and then clicking the trash can icon.

Select all OBPs before going out into the field.

After you've finished collecting data at an OBP, mark it as completed by drawing another line through that point.

Appendix I | Survey123

Data is entered into Survey123, which is an ArcGIS web application. You must log into Survey123 on a NYC Parks computer or mobile device. You can log in through a web browser or through the Survery123 mobile or desktop application.

<u>If using Survey123 in a browser:</u>

1) Go to this RSA Survery123 URL:
   https://survey123.arcgis.com/share/d0f59e2e1f084b0d9e86ee4fab2e9cca?portalUrl=https://webgis.parks.nycnet/Portal

2) Enter the following log-in credentials:
   Username: Firstname.Lastname@nycdpr
   Password: Parks Windows account credentials

3) The 'RSA Data Entry Form' should open. Begin filling out using your complete datasheets.
   - All text fields are searchable by typing characters in the search box. Note: Since sites and observation points are curated to the geography, you can search the list by the last 4 digits of the ID.
   - If you do not find the scientific species name in the drop-down menu, go to plants.usda.gov to find possible synonyms.

4) After all the data is entered, please review your work before submitting. Surveys submitted through this application CANNOT be edited in Survey123 after being submitted.

<u>If using the Survey123 mobile or desktop application:</u>

1) Logging in:
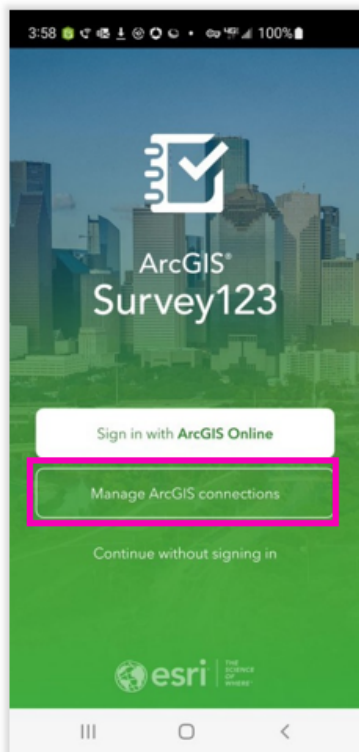
Open the Survey123 app on your mobile device. Click on the "Manage ArcGIS connections" button.

Click on "Add connection."
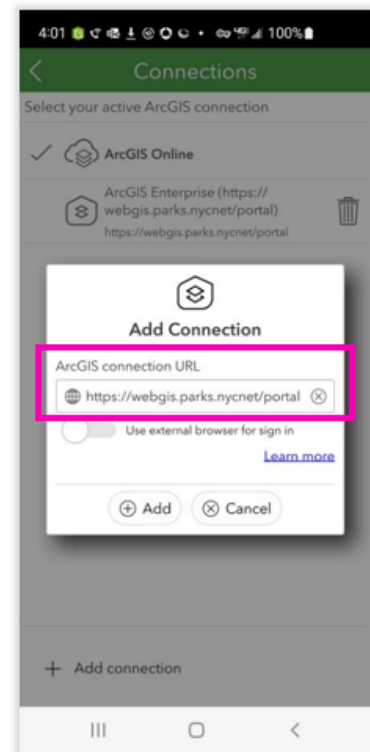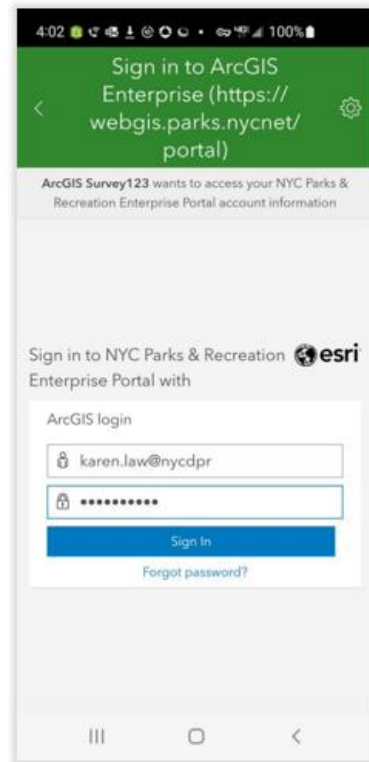
A pop-up window will appear. Type in https://webgis.parks.nycnet/portal. Click "Add."

Make sure the "ArcGIS Enterprise" connection is checked off. Click the back button to return to the log-in page.
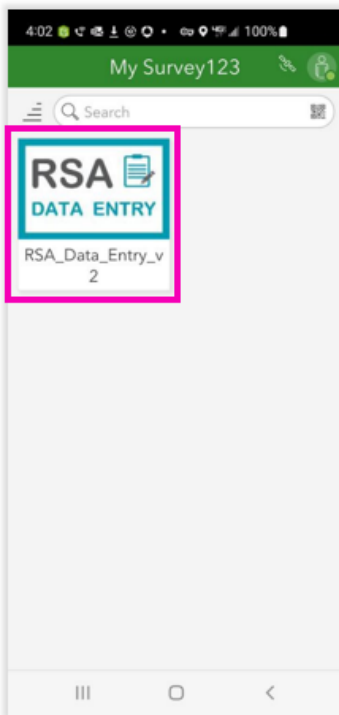
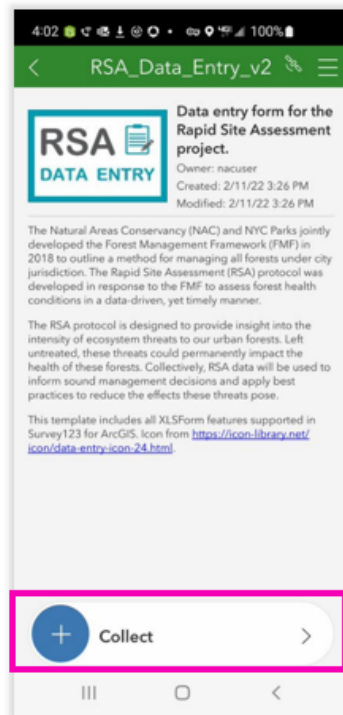

Click the "Sign in with ArcGIS Enterprise" button.

Type in Firstname.Lastname@nycdpr and your Parks account credentials. Click "Sign In."
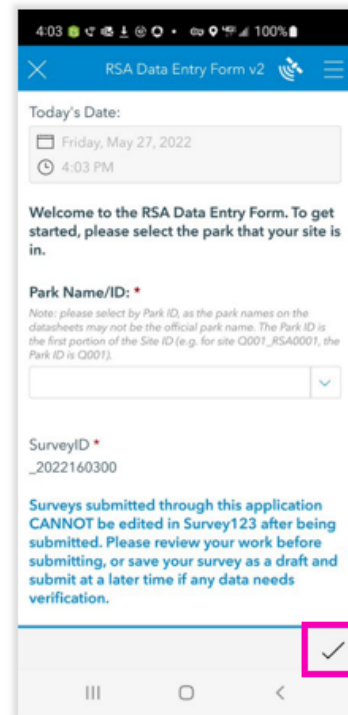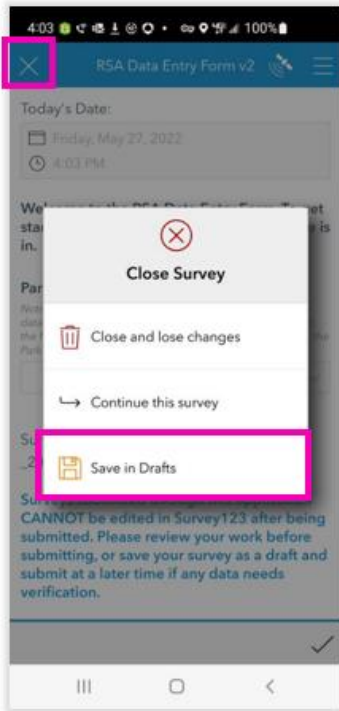
2) Enter data:

Click on the RSA Data Entry icon.
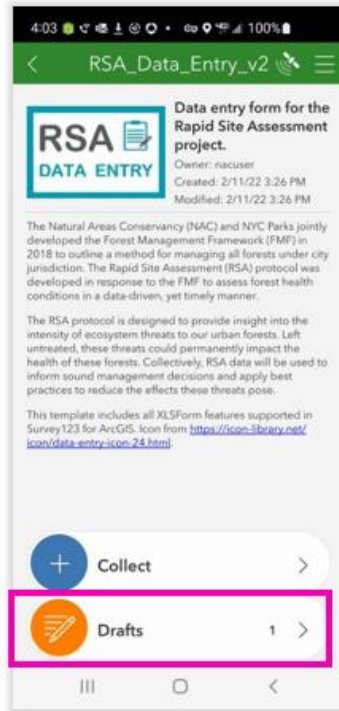

Click "Collect."

Begin entering data. Check your work before submitting. Click the check mark to submit the form. Changes cannot be made to the form once submitted.

3) Saving a draft of your data entry form:

If you cannot finish entering data before submitting the form, you can click the "x" button at the top left of the screen. In the pop-up window, click "Save in Drafts."

When you return to the RSA Data Entry form, you will see a Drafts button, which will list your draft data entries.

Appendix J | Connecting to Trimble R2 Device

When navigating to the center of an Observation Point, it is essential that your ArcGIS Field Maps app is connected to your Trimble R2 device. This ensures accurate GPS locations so that Observation Point data can be recollected later at the same location.
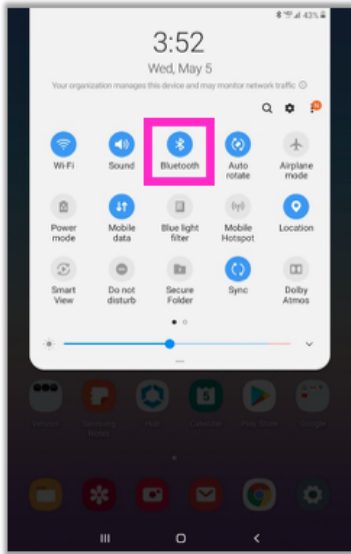
Download Trimble Mobile Manager from App Store (iPhone) or Play Store (Android)
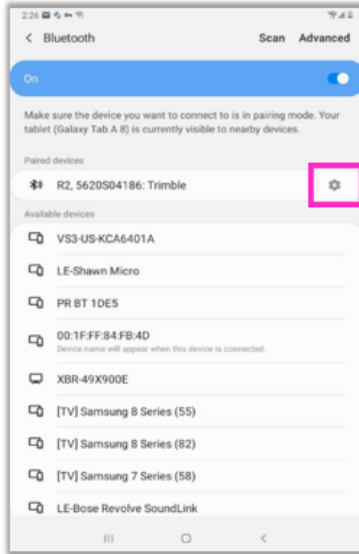
Pairing Mobile Device to R2

➢ Insert R2 battery and turn on R2 device by pressing power button on the side. Symbol will light up green when powered on.

Go into your Bluetooth settings, and make sure Bluetooth is turned on.

Select your R2 serial number (location on image below). If connected successfully, the device will show up in "Paired devices". Then select settings.
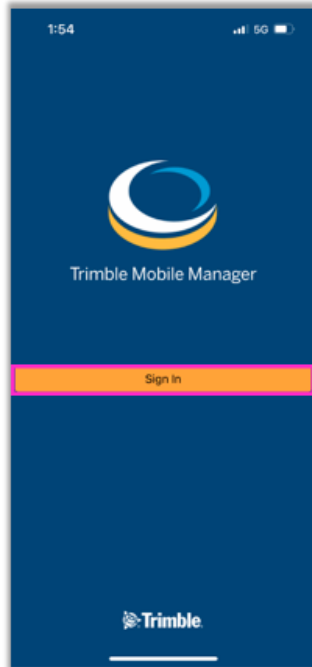
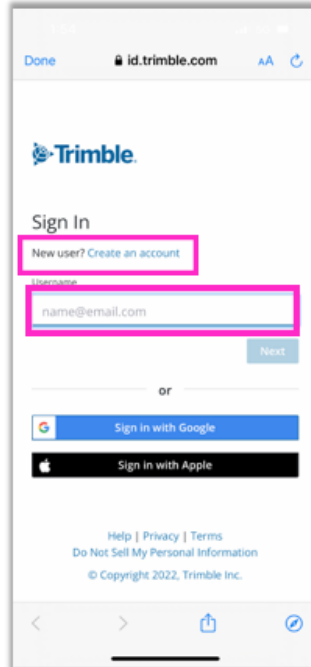Make sure bluetooth is not being used for internet access by turning internet access off.

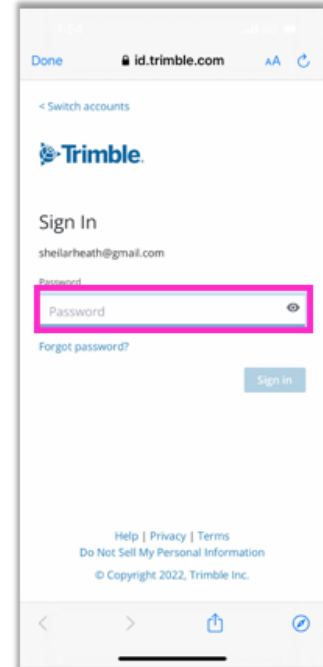Screw onto backpack here

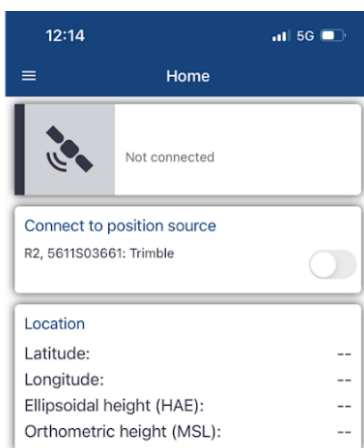Serial number

Connecting R2 to Trimble Mobile Manager
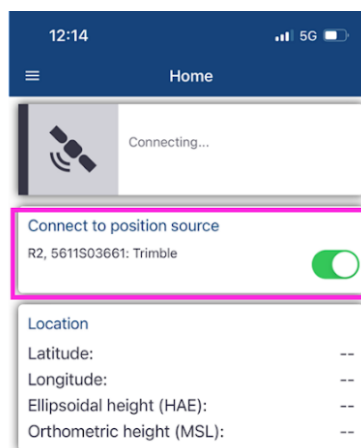

Select "Sign in"

If you haven't created an account yet, select "Create an Account". Once you've gone through those steps, enter your username on this page and select "Next".
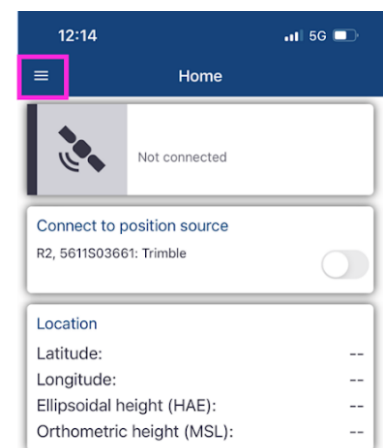

Enter your password and select "Sign in"

When you open Trimble Mobile Manager, this is what you should see

If the R2 that you're connected to via Bluetooth is shown here, turn the toggle on to connect. You should see an indication of estimated accuracy at the top.

If the R2 you're connected to is not listed here, select the menu option
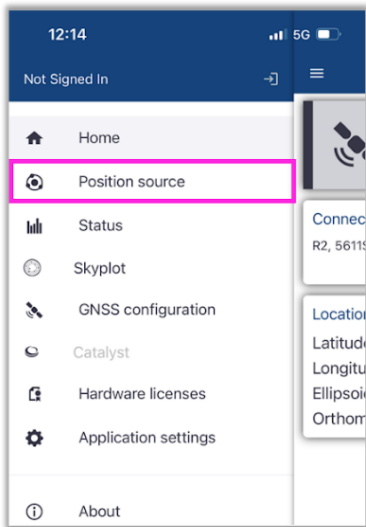
Select Position Source
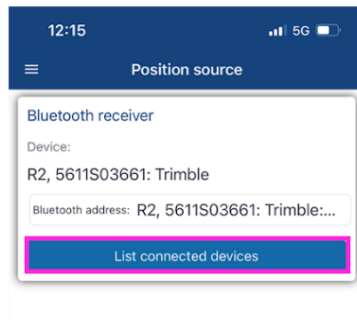
If the correct R2 is not here, select
List connected devices
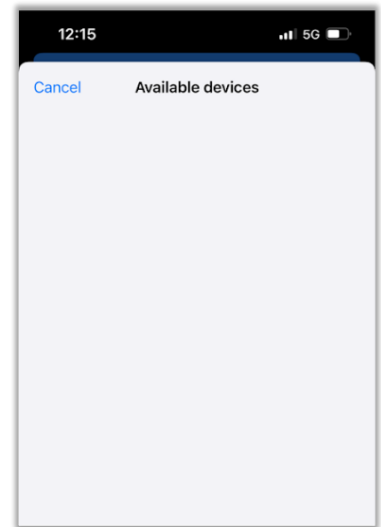
If your R2 is connected via
Bluetooth, it should be listed here,
and you can select it. If not, make
sure it is connected to bluetooth

Connecting R2 to Field Maps app

Open up your field maps app.
On the main screen, select
"Maps"
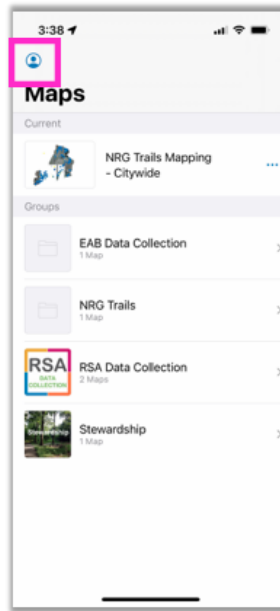
Select the icon in the upper left
hand corner
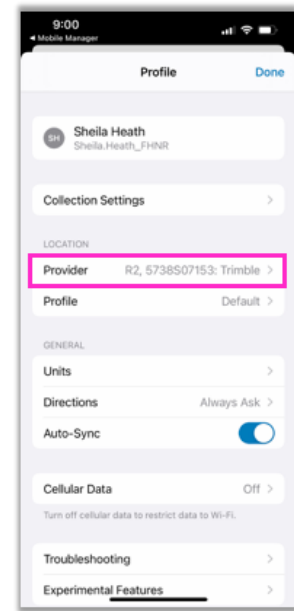
Select "Provider"
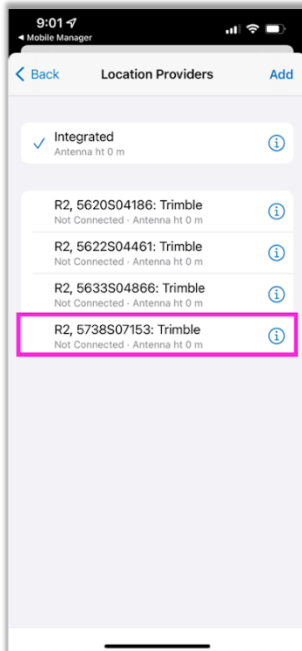
If Location Provider is set to
Integrated, select the R2
connected to your bluetooth.
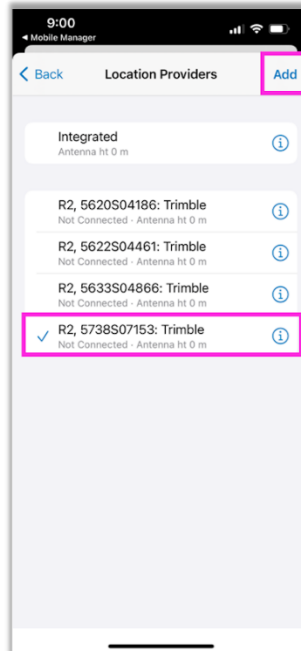
When you've selected the correct R2, check
mark will appear to the left of the serial
number, and it should say "Connected".
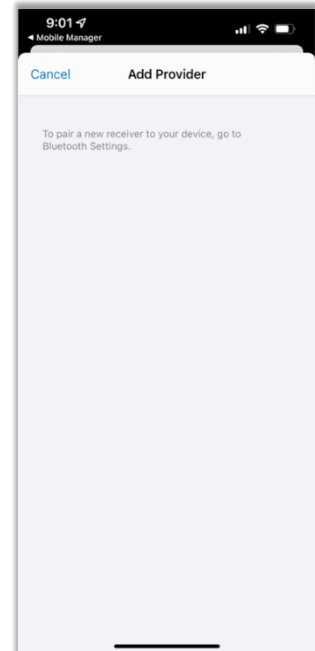
If the R2 you are looking for is
not shown, select "Add" and the
correct R2 should appear here.

When you've successfully connected to your R2, GPS accuracy should change to less than 3m

Make sure to have your Trimble backpack with you. Attach R2 to one of the attachments at the top. R2 needs to be upright and uncovered to work.

Appendix K | RSA Site Creation Protocol

The RSA Site Creation Protocol provides decision-making tools that site managers can use to determine if RSA is appropriate for a management or restoration site. The protocol also provides a step-by-step guide to drawing a draft RSA site in ArcGIS. Site managers are responsible for drawing the draft RSA site before work commences at a long-term management or restoration area.

To RSA or not to RSA

➢ The purpose of RSA is to capture a snapshot of forest condition **both before and after a long-term natural area management or restoration project**. Long-term generally means that there is a work plan for the area spanning at least 2 years. Ideally, a long-term management or restoration site will have an associated management site drawn in the Management Site ArcGIS layer.

➢ Follow the below flow chart to determine if you should collect RSA data at your site. If you are unsure whether RSA data should be collected at your site, please contact the NYC Parks Monitoring and Assessment crew supervisor or the Director of Natural Areas Management.
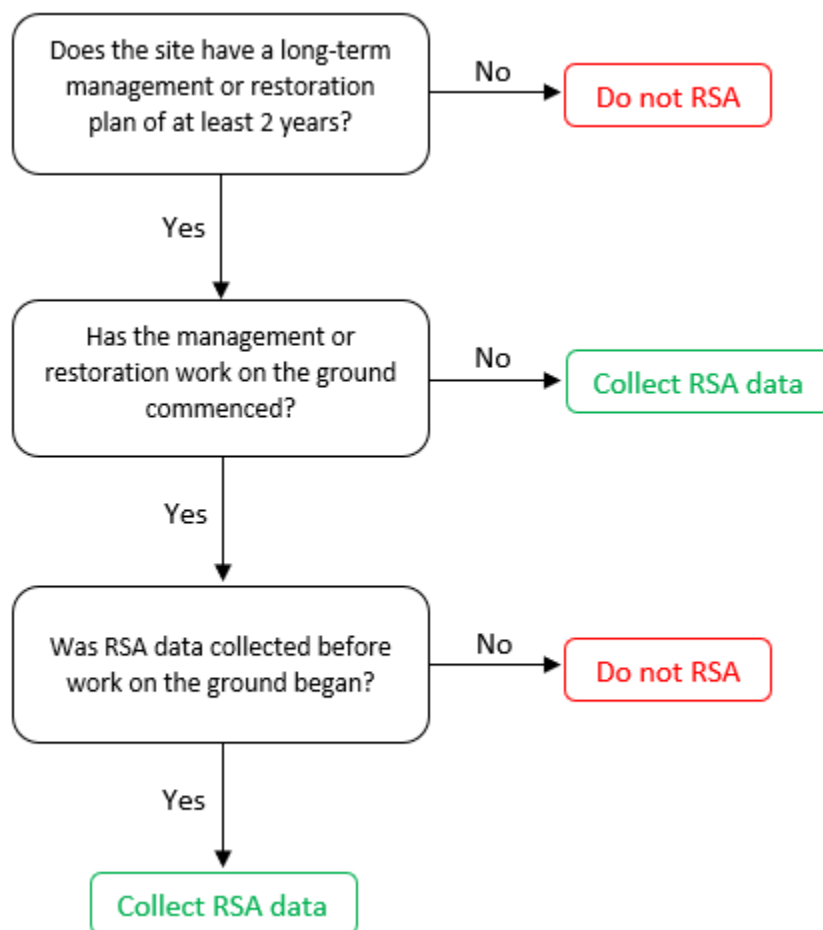
When to RSA

➢ The annual RSA workflow begins in winter and early spring, when site managers begin to consider areas where they might want RSA data collected. See the workflow chart below to see deadlines for submitting draft RSA sites, and the process by which a draft RSA site is approved for data collection.

Site Creation

- **Site managers** draw draft RSA polygons in ArcMap.
- First deadline for draft RSA site creation is March 15 of each year
- Draft RSA sites can continue to be submitted throughout the field season
- The earlier you submit a draft RSA site, the more likely data can be collected the same year.

Quality Control

- **Monitoring & Assessment crew supervisor** QA's and prioritizes sites.
- **GIS/Analytics data manager** QA's and publishes draft RSA sites to the RSA Field Map.

RSA Field Season Commences

- **Monitoring & Assessment crew** collects RSA data from mid-May to late-September.
- **GIS/Analytics data manager** QA's the RSA data as it is entered and publishes the data to the RSA ArcGIS database.

Rules for drawing your draft RSA Site

➢ Please only create sites that are do-able within the current field season.
➢ An RSA site can be a representative subset of the larger management or restoration area.
➢ Sites can be but do not necessarily need to be bounded by features that are visible on the ground, including roads, trails, buildings, fences, and sidewalks.
➢ Sites should be 20+ meters wide. Verify this using the measure tool.
   ▪ This is to ensure that the observation points (20m diameter circles) can fit inside of the site.
➢ Sites should be no smaller than 0.5 acres. Verify this using the measure tool.
➢ Sites should not overlap any other RSA site.

Drawing your Draft RSA Site in ArcGIS

If you are a site manager, please proceed with the following instructions on how to draw draft RSA sites in ArcMap. If you are a non-Parks site manager requesting an RSA, please contact the NYC Parks Monitoring & Assessment supervisor or the Director of Natural Areas Management for their assistance in drawing the sites.

1. Open the RSA Site Generation MXD:
   MXD name: RSA Site Generation
   MXD location: J:\NRG\GIS\GIS_Projects\NAC\FMF_RSA\MXD\RSA Site Generation
   Layer name: FHNR_Apps.RSA.DraftSites

The following layers will be available to view in the MXD:
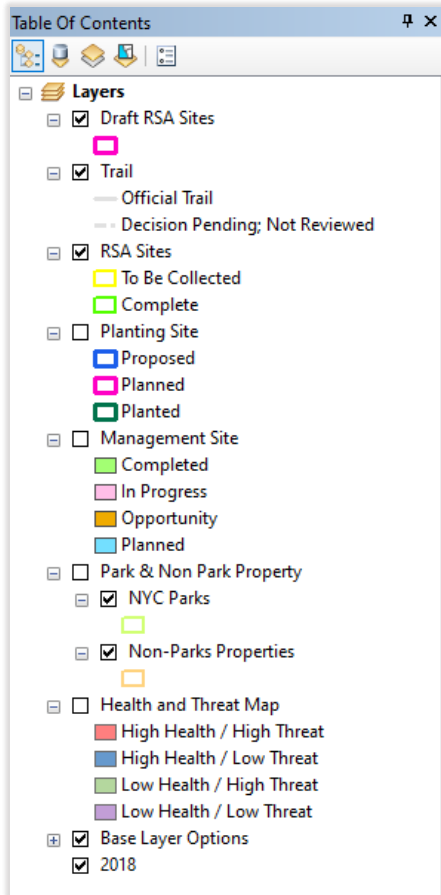
2. Start an editing session with the 'Draft RSA Sites' layer.

3. Draw a polygon representing the area that you want RSA data to be collected.

4. Fill in the following information in the attribute table for your polygon:
    - **GISPROPNUM**: the park code (ex. "X039")
    - **Site_Name**: A short title describing the site. It can include the team requesting the RSA site (ex. "Contractor BartowPell")

5. Save the edits and exit the editing session. Verify that the draft RSA site was saved by checking the 'Draft RSA Sites' attribute table.

Appendix L | FIRST

FIRST stands for Forest Identification and Restoration Selection Tool. FIRST was developed as part of a larger project to create climate-adaptive planting palettes for forest restoration projects in the New York City Metropolitan Region. Using this tool, users can:

Identify a forest community type in the field.

Get a planting palette of species that are resilient to climate change and appropriate to the community.

The output from this tool that is required for the RSA is the community type.

To determine community type using FIRST:

➢ Navigate to FIRST (link).

➢ Select the button that says: <u>Choose a restoration planting plan by identifying a forest</u>.

➢ Follow the instructions.

➢ These instructions take you through a key by presenting you with options to choose from.

➢ On each page, choose the option that most closely describes the conditions at your OBP.

➢ Determine the community type.

➢ The output of FIRST will provide you with the a) CEGL code of your community type; b) name of your community type; c) description of your community type:

Forest Identification and Restoration Selection Tool

CEGL006125
High Allegheny Rich Red Oak - Sugar Maple Forest

This red oak - sugar maple community is found primarily in the Allegheny Plateau and Appalachian Mountains of the United States, as well as on the northern Piedmont north to the Hudson Valley, with possible extensions east and west of those areas. It is typically found in coves, on moist north- and east-facing slopes and on well-drained flats. Soils are slightly acidic and of intermediate fertility. The closed-canopy tree layer is dominated by a mixture of oaks, primarily Quercus alba and Quercus rubra, with other hardwoods including Acer saccharum, Acer rubrum, and Liriodendron tulipifera. Carya ovata, Carya alba (= Carya tomentosa), Nyssa sylvatica, and Quercus velutina are possible associates. Carya spp. may share dominance in some stands. Dominance by Acer rubrum or Liriodendron may indicate a past disturbance history. A wide variety of more mesic associates, such as Betula alleghaniensis, Betula lenta, Fagus grandifolia, Fraxinus americana, and Tilia americana could occur but are negligible in dominance. In addition to Acer saccharum reproduction, some understory species may include Carpinus caroliniana, Cercis canadensis, Cornus florida, and Ostrya virginiana. Shrub and vine species include Amelanchier laevis, Amelanchier arborea, Cornus spp., Hamamelis virginiana, Lindera benzoin, Viburnum acerifolium, Viburnum recognitum, and Vitis riparia. Ericaceous shrubs, such as Kalmia latifolia, Vaccinium angustifolium and Vaccinium pallidum, may also be present but are not abundant. The ground layer species are highly variable but include Caulophyllum thalictroides, Ageratina altissima, Dennstaedtia punctilobula, Podophyllum peltatum, Maianthemum racemosum (= Smilacina racemosa), Medeola virginiana, Thelypteris noveboracensis, Dryopteris marginalis, Dryopteris intermedia, Actaea spp., and Uvularia sessilifolia. Exotic species, including Rosa multiflora and Alliaria petiolata, may be present in the shrub and herb layers of disturbed stands.

view species list

➢ The most important information on the output page is the CEGL code (highlighted above).

➢ Enter the CEGL Code and the Community Type Name on your datasheet.

Appendix M | Data Sheets

The following pages include all datasheets required to conduct RSA data collection. The formatting of these pages is limited to allow for the datasheet to occupy most of the page, so there are no page numbers and no appendix headings.

The datasheets included are as follows, in order:

1. RSA Groundcover Species Datasheet 1: A datasheet that includes the General Info section, as well as the beginning of the Groundcover Species section.

2. RSA Groundcover Species Datasheet 2: A datasheet that serves as a continuation of the above datasheet, providing more space to record Groundcover Species.

3. RSA Stem Count Datasheet: The datasheet where woody species are recorded.

4. Unknown Species Tracking Sheet: The location to write information about plant specimens of unknown species identity, to aid in identification at a later date.

5. Plant Press Table of Contents: A table of contents that can be taped to the front if your plant press to help you keep track of the contents and final species identifications.

☐ **Digital Data Entry Started** ☐ **Digital Data Entry Complete**

General Info		
RSA Site ID:	**Community Type Name:** (https://tinyurl.com/NAC-FIRST)	
Observation Point ID:	**CEGL Code:**	
Park Name:	**Coarse Woody Debris**	**Percent Cover** (circle one)
Date:		*0 | <5 | 5-25 | 26-50 | 51-75 | 76-100*
Data Recorder:	**Comments:**	
Data Collectors:		

Entered	Groundcover Species Data — *OBP % cover range at or below 1.37m ("breast height") • Vascular groundcover species (herbs, vines, shrubs & trees - no bryophytes) • Include lawn as "mowed lawn."*	
	Scientific Name	**Percent Cover** (circle one)
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*
☐		*<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100*

Site ID: _____   **OBP ID: _____**   **Date: _____**

Entered	Groundcover Species Data *OBP % cover range at or below 1.37m ("breast height") • Vascular groundcover species (herbs, vines, shrubs & trees - no bryophytes) • Include lawn as "mowed lawn."*	
	Scientific Name	**Percent Cover (circle one)**
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100
☐		<1 | 1-10 | 11-25 | 26-50 | 51-75 | 76-100

Site ID: _____   **OBP ID:** _____   **Date:** _____

Entered	**Forest Layer (DBH Category):** Scientific Name	**SEEDLING** (<2cm DBH) Seedling Tally	**MIDSTORY** (2-9.9 cm DBH) Midstory Tally	Tally w/ Invasive Vines *Subset of total midstory*	**OVERSTORY** (≥10 cm DBH) *(Intermediate values assigned by rounding)* 10-30cm Tally	31-50 cm Tally	51-75 cm Tally	>75 cm Tally	Tally w/ Invasive Vines *Subset of total overstory*
☐									
☐									
☐									
☐									
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☐									
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☐									
☐									

Stem Count Data
Limit to woody species that can be counted/measured per stem (trees, shrubs, some subshrubs). Vines are not included.

Natural Areas Conservancy

Unknown Species Tracking Sheet

Date Collected	Site ID	Collector	Collection Method	Unknown #	Growth Habit	Description

PLANT PRESS TABLE OF CONTENTS

Team:

	Date	Site ID	Unknown #	Final Species Identification
1				
2				
3				
4				
5				
6				
7				
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9				
10				
11				
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