

Purple Loosestrife Biocontrol Volunteer Science Project Instruction Manual



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Introduction

Purple loosestrife (*Lythrum salicaria*) is a wetland plant native to Europe and Asia that was introduced to North America in the late 1800s. The flowering plant was originally used as an ornamental due to its bright purple flowers, as well as for attracting bees to make honey. Once established, purple loosestrife drastically outcompetes Minnesota's native wetland plants and causes decreases in plant biodiversity and in native habitats. This, in turn, causes semi-aquatic habitats to become more vulnerable to irreversible damage during extreme events such as low water. Purple loosestrife is listed as a Minnesota Department of Agriculture (MDA) prohibited control noxious weed and is considered a prohibited invasive species in Minnesota. According to the Minnesota Department of Natural Resources (MN DNR), this means that, "it is unlawful (a misdemeanor) to possess, import, purchase, transport or introduce this species except under a permit for disposal, control, research or education." The uncontrolled presence of purple loosestrife threatens the future of Minnesota's natural wetlands, streams, rivers, lakes, and shorelines.

Galerucella is a genus of beetle native to Eurasia that is known to consume only purple loosestrife (Figure 1). Because the Galerucella beetle does not cause any threat to native plants, it is used as a management tool to decrease the density and seed output of purple loosestrife. This, in turn, minimizes purple loosestrife's negative impact on native habitat by allowing native plants the opportunity to thrive. The use of the Galerucella beetle as a management tool against purple loosestrife is considered a biological control (biocontrol), since it is the practice of using a species' natural predator as a means to control it. It is important to note that Galerucella beetles are not used to eradicate purple loosestrife, but instead are used to keep the invasive plant in check.

There are two species of Galerucella beetle that are used for biocontrol in MN and WI: *Galerucella calmariensis* and *G. pusilla*. Both species cause harm to purple loosestrife plants by feeding on their leaves and shoots, and have been used as a biocontrol in citizen science projects for purple loosestrife in both MN and WI since 1997.



Figure 1
Photo provided by Katrina Scheiner, USFWS

Overview

As a volunteer for the purple loosestrife biocontrol volunteer science project, you will be helping to protect and preserve the native plants of Minnesota by independently raising *Galerucella* beetles for eventual release. As mentioned above, purple loosestrife threatens native plant communities in wetlands and along shorelines. Therefore, the goal of the Purple Loosestrife Biocontrol Volunteer Science Project is to help *Galerucella* beetles to reproduce to diminish the negative effects of purple loosestrife on native plant communities.

As a volunteer, you are helping to create a more vigorous native plant community within the St. Croix watershed and to protect the natural areas you know and love. With the support of the Conservancy, you will be expected to:

- Set up a purple loosestrife rearing cage with the supplies provided in the kit
- Water and care for purple loosestrife plants for at least one hour per week for a four-month period
- Accurately fill out a plant condition evaluation form weekly to evaluate growth and beetle release dates
- Release beetles raised during a Conservancy release event or individually at a pre-approved location

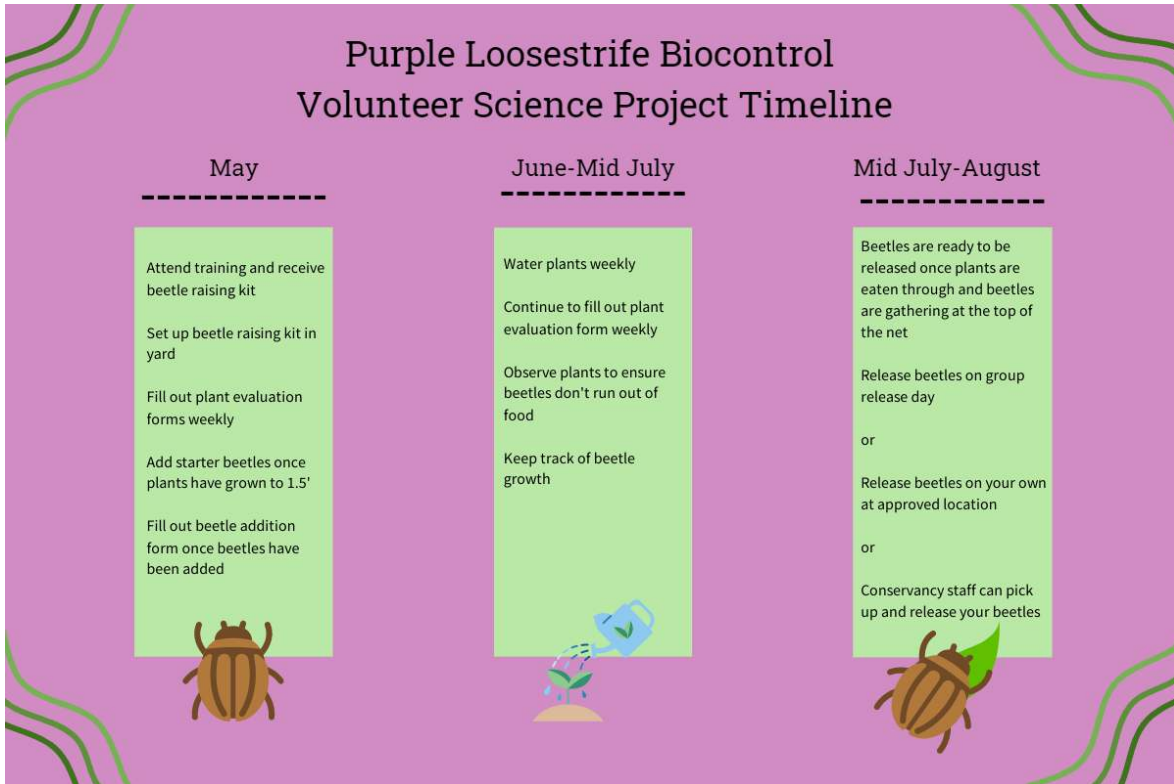


Figure 2
Graphic provided by Maria Young, Wild Rivers Conservancy

Calendar of Events

Event	Date	Description
Purple Loosestrife Rootstock Digging	Thursday, May 11th, 2023	Volunteers will help dig and repot purple loosestrife for use in biocontrol project, not required to attend to help raise the beetles
Beetle-Raiser Volunteer Training	Saturday, May 13th, 2023	Volunteers are required to attend the training to participate in beetle raising, volunteers will learn about project set-up and weekly duties, volunteers will receive kits
Conservancy Beetle Release Day	Mid-July to Mid-August 2023	Planned mass release day to release beetles raised to purple loosestrife infested areas within the St. Croix River watershed

Purple Loosestrife Rootstock Digging

Purple loosestrife rootstock needs to be dug in late April to early May (weather depending) to ensure that the plants have had enough time to grow large enough to support the beetles that will be added later.

It is important to wear proper gear when digging purple loosestrife. Purple loosestrife grows in wet soil, so tall boots or waders are recommended. Long sleeves are also recommended for the job. Other tools needed to dig rootstock include a shove, large black garbage bags, gloves, garden shears, a stiff-bristle brush, and water. Permits are also required to move purple loosestrife in Minnesota. The Conservancy will have a permit to dig purple loosestrife on the rootstock digging days. Volunteers are requested to not dig purple loosestrife on their own unless applying for an individual permit.

Be sure to properly decontaminate your gear after use by brushing with a stiff-bristle brush and rinsing with clean water. If available, hand-held steamers can also be used to kill seeds and organisms on gear. Leave gear out to dry for five days before using again to avoid transporting seeds to new areas.

Set-Up



Figure 3

Photo Provided by Chris Hamerla, Golden Sands RC&D



Figure 4

Photo Provided by Friends of North Pikes Creek Wetland



Figure 5
Photo Provided by Golden Sands RC&D



Figure 6
Photo Provided by J Kristoffersen, Williams Bay

Included in your purple loosestrife biocontrol kit received at training is all that is needed to properly raise your *Galerucella* beetles. Your kit should include: a kiddie pool, purple loosestrife plants, potting soil, netting, hair ties, bungee cords, a clothesline, and (eventually) *Galerucella* beetles.

Start by finding a spot to place your set-up. Your purple loosestrife plants will already be planted in pots with three parts black potting soil to one part perlite. It is best to place your purple loosestrife plants in an area with full sun where they are also protected from extreme wind. There should also be a nearby water source, as well as space to hang up the provided clothesline. Hang the clothesline so it is hanging about 6 feet above the ground. Then, working on one plant at a time:

- Place one end of your netting around the pot and secure it tightly with a bungee cord
- Close off the other end of the netting with a hair tie
- Arrange all pots in a kiddie pool
- Move the kiddie pool so it is underneath the clothesline and attach the netting to the clothesline to hold the netting upright. Nets should be tall enough to give plants five to six feet of room to grow.
- Finally, fill the kiddie pool with water up to the drainage holes that will be pre-drilled for convenience. Water level should be two inches below the soil height.

If your yard does not have adequate space to hang up the provided clothesline, you also have the option of securing the top of the netting to a bamboo stake placed in the pot. If this option is preferable to using the clothesline, please notify the Conservancy and we will provide you with the proper materials.

Plants may require watering multiple times a week, depending on rain. You will know when it is time to replenish your plants' water supply when the water level in the kiddie pool has depleted below the drainage holes. If rain does occur, this may reduce watering to once a week or once every other week.

Once a week, you will be required to fill out and submit the Purple Loosestrife Plant Condition Evaluation form, which can be found on the Purple Loosestrife Biocontrol project webpage. To track the height of each purple loosestrife plant effectively, it is recommended you label your pots by number.

Adding Starter Beetles

Purple loosestrife plants are ready for beetles when they are around 18 inches tall. You will receive your beetles in plastic vials, with one vial intended for each plant. For each plant, remove the hair tie from the top of the net, take the cover off the vial of beetles, and drop the vial onto the plant before closing the net with the hair tie and reattaching it to the clothesline. Ensure that the vial lands open-side up to allow the beetles to crawl onto the plant. Fill out the Galerucella Beetle Addition form (included at the end of this manual) once completed, and submit via email/in-person drop off.

Once added, the starter beetles will begin to reproduce and lay eggs on the leaves. Larvae will hatch from the eggs 2-3 weeks after the eggs are laid (Figure 7). The larvae will eat the purple loosestrife leaves/foilage before burrowing into the soil to pupate and emerge as adult beetles. Sometimes, so many larvae will hatch that they will begin to eat the plant too quickly and deplete their food source, so mid-week checks at this time can be valuable to prevent larval death. This will also help keep track of water needs. **If you do notice severe declines in your plant health, do not hesitate to contact Maria Young, invasive species specialist, by emailing myoung@wildriversconservancy.org or calling 715-483-3300 ext. 21.**

Continue to fill out the Purple Loosestrife Plant Condition Evaluation form weekly to evaluate beetle growth and plant health. Use this form to document noticed effects on the plants, such as damage from beetles and larvae (Figure 8). Forms are to be submitted online and can be found on the Purple Loosestrife Biocontrol Project webpage.



Figure 7
Photo Provided by Chris Hamerla,
Golden Sands RC&D



Figure 8
Photo Provided by Katie Sickmann,
Wild Rivers Conservancy

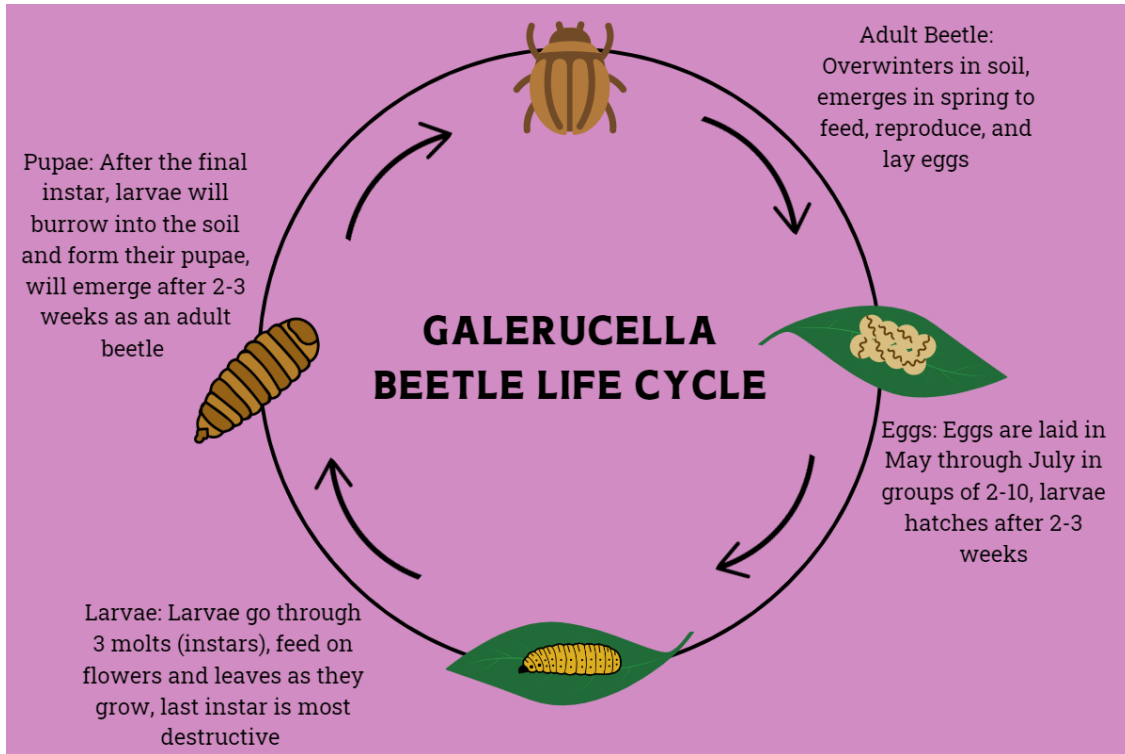


Figure 9

Plant Care

Caring for your purple loosestrife plants has been made simple by the use of the kiddie pools. Pre-drilled holes in the pools prevent overwatering as they allow for excess water to drain out of the pools. At least once per week, fill the pools with water above the drain holes to flush out old water, which will prevent mosquito larvae from growing. It is highly recommended not to use mosquito spray in your rearing area or in the surrounding area due to its potential negative effect on the beetles.

If plants are not growing after two weeks, add fertilizer to the pots. When plant stems are 12-15 inches tall, pull back the top two leaves and trim the tip of the stem off (Figure 10). This will increase the plant's growth and provide more food for the Galerucella beetles. Plants will begin to flower starting in July.



Figure 10

Photo Provided by Chris Hamerla, Golden Sands RC&D

Releasing Your Beetles

Most beetles are ready to be released any time from mid-July to mid-August. The key is to diligently track the health of the plant and the growth of the beetles. You will know that it is time to release your beetles once all the plants have been completely eaten through and there are large numbers of beetles on the top of the net. **Contact the Maria Young, invasive species specialist, immediately if you notice severe plant damage or a large number (many dozens to hundreds) of beetles on the net, indicating that the beetles must be released right away.**

Volunteers have three options when it comes to releasing their beetles; 1) volunteers can release their beetles on one of the Conservancy's beetle release days, 2) volunteers can opt to have Conservancy staff release their beetles for them, or 3) volunteers can release their beetles on their own at a preapproved location. A questionnaire will be sent out in the weeks leading up to the time of beetle release for volunteers to select their beetle release option. No matter the option, when transporting your beetles/plants, always transport the entire plant- including the net.

If plants are being moved using a trailer/boat, lay the plant down flat so as to not lose any beetles (Figure 11).



Figure 11

Photo Provided by Katie Sickmann, Wild Rivers Conservancy

If you choose to release the beetles on your own, you will be expected to communicate the date and location of release with the Conservancy ahead of time for approval. You will be required to fill out a beetle release form. Landowner permission must be acquired as well, so keep this in mind. Some other considerations to think about when selecting a release site are:

1. Are there at least 50 purple loosestrife plants?
2. How tall are the plants?
3. Are the plants growing close together or are they widely scattered?
4. Do the leaves of the plant show feeding damage?

On the day of release, after your site is approved by the Conservancy, transport your plants to the desired location with the nets still on to prevent beetles from escaping. After placing the plants where they will stay, remove the nets from the pots. Gently shake all beetles from the net- you will be taking the net with you. Then, remove the plants from the pots and evenly spread the plants throughout the release location, placing each plant next to a free-growing plant. By

placing the entire plant, you are ensuring that all *Galerucella* beetles and larvae will be released. Intertwine the stems of the plants you have raised with the stems of the purple loosestrife plants at the site. This will allow any remaining larvae to crawl to fresh leaves. Then, fill out the Purple Loosestrife Biocontrol Volunteer Science Project Beetle Release form, recording as much detail as possible, including the exact coordinates of release location for each plant. Coordinates can be found using a smartphone or tablet by using a compass app (Appendix 1) or Google Maps (Appendix 2). Please note that data usage will most likely be required for gathering coordinates on an electronic device. Coordinates can also be taken using a handheld GPS unit, which are available for check-out at the Conservancy office (Appendix 3).

Be sure to properly decontaminate all boots and clothing worn during beetle release to prevent the spread of seeds and flowers. This can be done by brushing off all gear using a stiff-bristle brush and rinsing with clean water. If available, hand-held steamers can also be used to kill seeds and organisms on gear. All gear and equipment must be left to dry for five days before entering a different site.

If releasing the beetles on your own, you will be expected to return to the beetle release site two weeks after release to fill out the Site Revisit form. This form is intended to evaluate the effectiveness of the *Galerucella* beetle release. If necessary, navigate to each plant by using Google Maps (Appendix 3) or using a Garmin GPS (Appendix 4) with the coordinates recorded on the date of release. Take pictures of any observed beetle damage to leaves. This information will be used for future beetle release projects. Forms should then be returned to the Conservancy office, along with the rest of the beetle raising kits.

Troubleshooting

Q: What do I do if, after the larvae hatch, I see an extreme decline in the health of my purple loosestrife plants?

A: Contact Maria Young, invasive species specialist, immediately— additional plants may be needed to keep larvae alive

Q: What do I do if I don't have a place to hang my clothesline?

A: Contact Maria Young, invasive species specialist, and we will provide you with bamboo sticks to put in the pots to attach the nets to.

Q: How often do I need to water my purple loosestrife plants?

A: It is recommended to water your plants once or twice per week, depending on rain. If a rain event occurs, you may not need to water the plants that week.

Q: What steps do I take if I want to release the beetles on my own?

A: First, contact the Conservancy if you are interested in releasing the beetles on your own as opposed to releasing them on a group release day. If you have a release location in mind, please note that it must have a minimum of 50 purple loosestrife plants in order to be able to support the beetles once they are released. The Conservancy will evaluate the proposed release location. If approved, you will receive two forms- the beetle release form and the site revisit form. The beetle release form is to be filled out once you release your beetles. The site revisit form is to be filled out after you revisit the beetle release site to evaluate how well the beetles took to the site.

Appendix 1: Gathering Coordinates Using a Compass App

1. Open up your smartphone/tablet and click on the compass app
2. Once in the compass app, allow the compass to orient itself by waiting a few seconds
3. After allowing the compass to become oriented, the coordinates of your location should show at the bottom of the screen (Figure 12)
4. Record these coordinates on your beetle release form

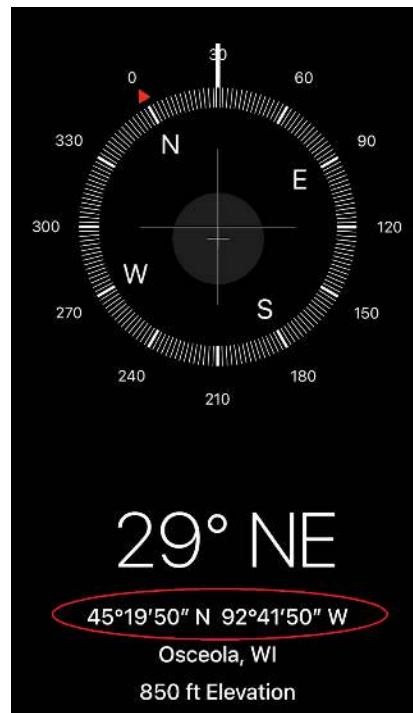


Figure 12

Appendix 2: Gathering Coordinates Using Google Maps

1. Open up your smartphone/tablet and click on Google Maps
2. Locate yourself on the map (should be represented by a blue dot) (Figure 13)

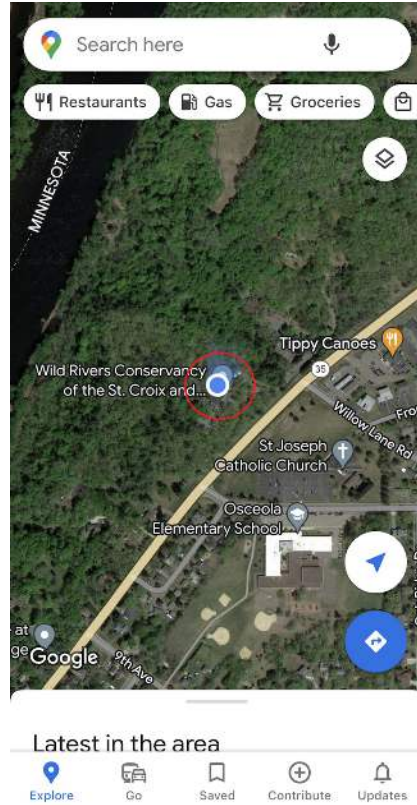


Figure 13

3. Press and hold on your location on the map, this will cause a menu to open up
4. Scroll down the menu to the GPS coordinates of your location (Figure 14)

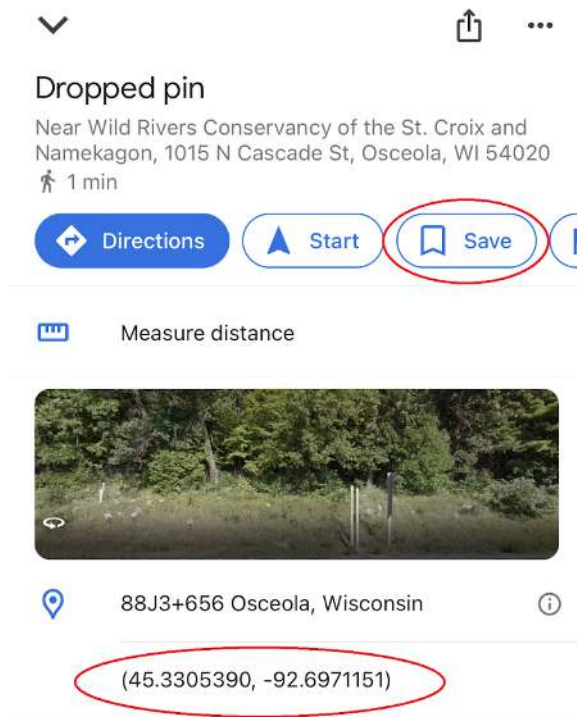


Figure 14

5. Record these coordinates on your beetle release form
6. To save the coordinates as a pin, select the “Save” button at the top of the screen
7. You can save this pin to any of the premade lists, or you can make your own by clicking on “New List” (Figure 15)

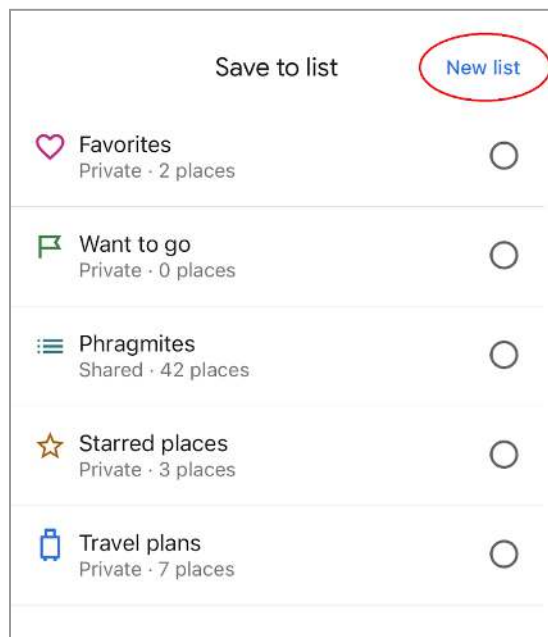


Figure 15

8. If making your own list, be sure to give it a descriptive name and click “Create” when done (Figure 16)

×

New list

CREATE

Purple Loosestrife Biocontrol Project

Give this list a description

LIST TYPE

Private ✓
Only you can view and edit

Shared
You can let others view or edit

Public
Your content will appear publicly with your profile name and picture. It will appear on Google services across the web, like Maps and Search, and on third-party sites and apps that use Google services. Your lists must comply with Google's policies. [Learn more](#)

Figure 16

9. Once you select a list to add the pin to, you can add a note about the place (ex: Beetle Release Site, Green Lake) (Figure 17)

×

Add a note

Done

Dropped pin

Purple Loosestrife Biocontrol Project · Private · 0 places

Beetle release site, Green Lake

Figure 17

10. When complete, click “Done” to save

Appendix 3: Using Google Maps to Navigate to a Site

1. Using your smartphone or tablet with data, open Google Maps
2. On the bottom ribbon, select “Saved” (Figure 18)

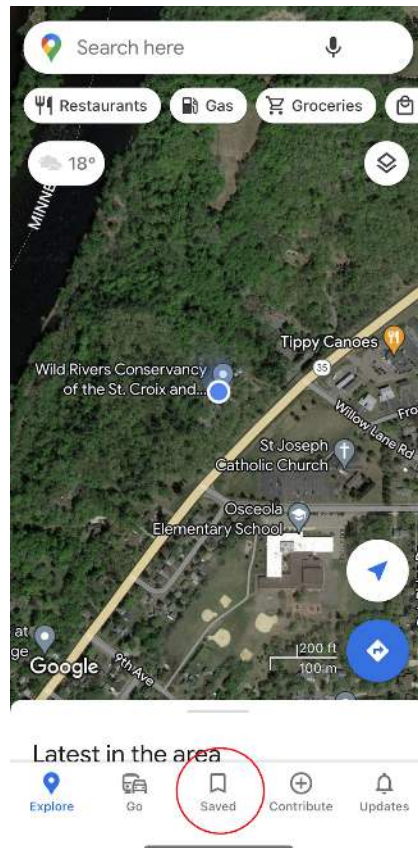


Figure 18

3. Click on the list your beetle release site is saved in (Figure 19)

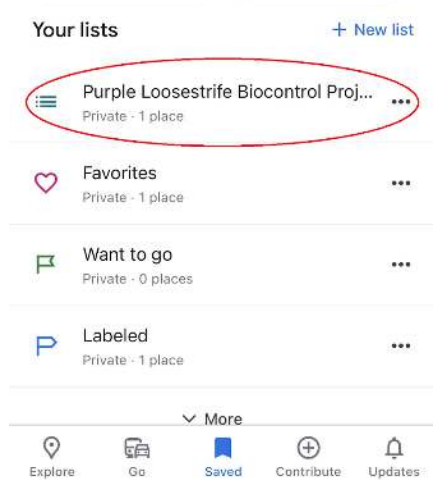


Figure 19

4. Select the coordinates of your beetle release site and once there, select “Start” (Figure 20)

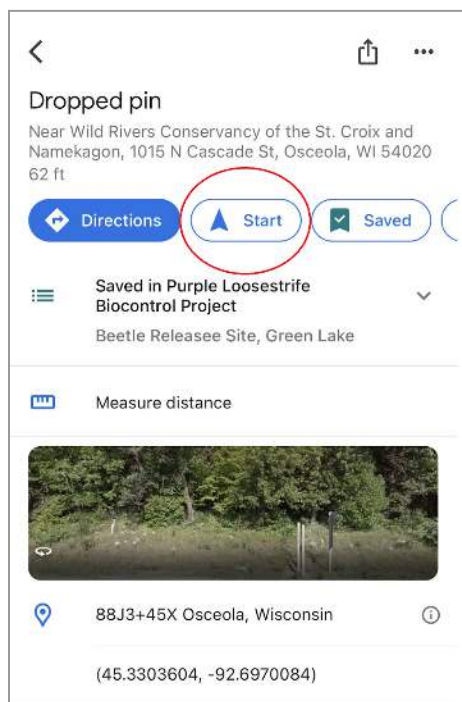


Figure 20

5. Follow the directions to lead you to your site

Appendix 4: Gathering Coordinates and Marking a Waypoint Using a Garmin GPS Device

1. Turn on the Garmin by pressing and holding the power button on the right side (Figure 21)



Figure 21

2. Using the thumbstick controller, navigate to “Mark Waypoint” (Figure 22)

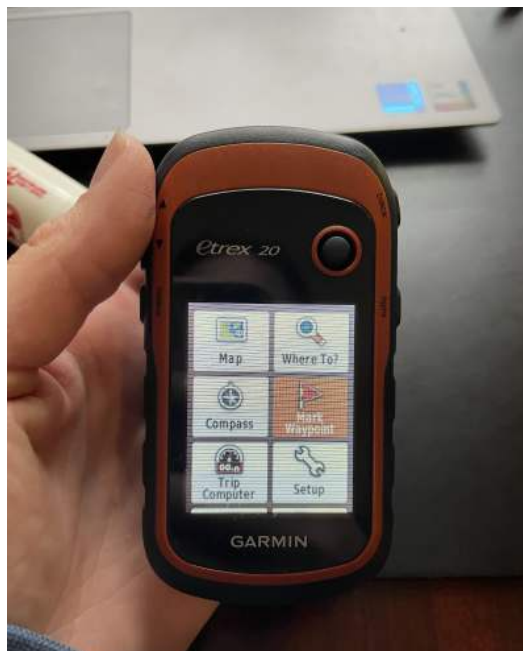


Figure 22

3. Once in the “Mark Waypoint” selection, you should see coordinates in the box labeled “Location” (Figure 23). Use these coordinates to fill out your beetle release form.

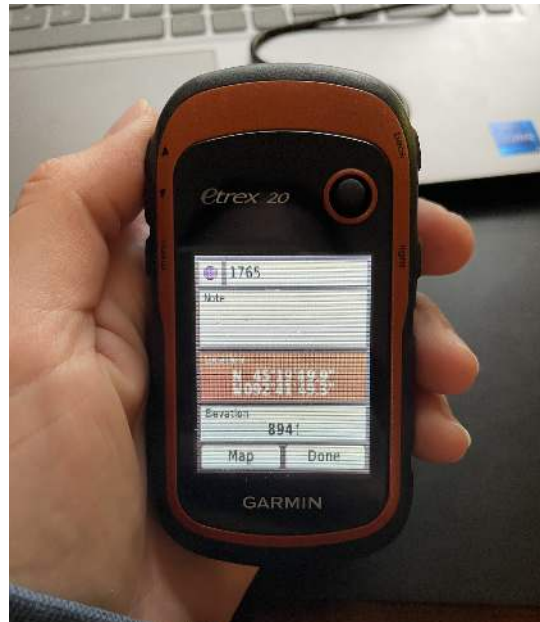


Figure 23

4. You can change the label of the waypoint by using the thumbstick controller and navigating to the number label at the top of the screen and selecting it. (Figure 24). This will bring up a keyboard- use this to type in your new label and hit done (Figure 25).



Figure 24



Figure 25

5. If you would like to add a note to the waypoint, navigate to the box labeled “Note” and select it (Figure 26). Once again, use the keyboard to type in your notes and select “Done” when finished (Figure 27).



Figure 26

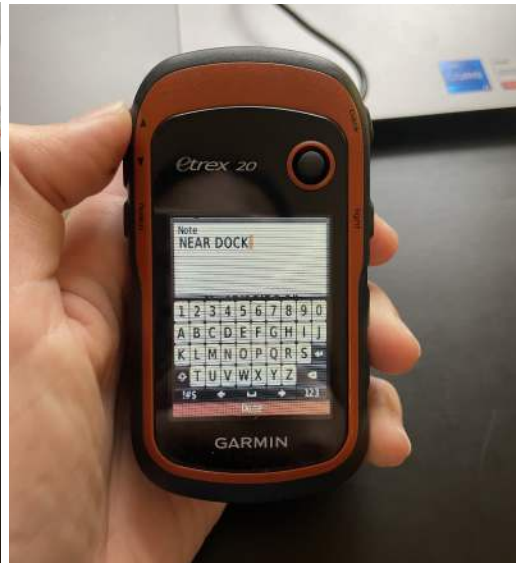


Figure 27

6. To finish creating the waypoint, navigate to the bottom of the screen and click the “Done” button. This will save your waypoint. (Figure 28).

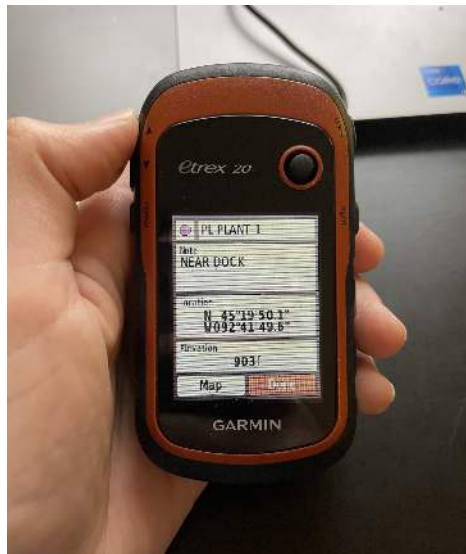


Figure 28

Appendix 5: Using a Garmin to Navigate to a Waypoint

1. Turn on your Garmin and click on “Where To” using the thumbstick controller (Figure 29)



Figure 29

2. Click on “Waypoints” in the “Where To” tab (Figure 30)



Figure 30

3. Find and click on the point you are trying to navigate to (Figure 31)



Figure 31

4. Select "Go" and follow the blue arrow until you reach your waypoint (Figure 32)



Figure 32

Questions?

Contact Maria Young, Invasive Species Specialist

Email: myoung@wildriversconservancy.org

Phone: 715-483-3300 ext. 21