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# Purple Loosestrife Biocontrol Volunteer Science Project Instruction Manual



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Purple loosestrife plant in bloom

Photo provided by Sierra Stukenholtz, Wild Rivers Conservancy

## Introduction

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Purple loosestrife (*Lythrum salicaria*) is a wetland plant native to Europe and Asia that was introduced to North America in the late 1800s. Some believe that the flowering plant was intentionally introduced as an ornamental plant that attracts pollinators, while others believe it was unintentionally introduced in the ballast water of ships. No matter its method of introduction, once purple loosestrife is established, it drastically outcompetes wetland plants that are native to North America and causes decreases in plant biodiversity. A lack of plant biodiversity in any habitat type can decrease a habitat's resilience during extreme events, such as low water or flooding, and therefore can lead to permanent damage or alteration of the habitat.

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." In Wisconsin, purple loosestrife is listed as a restricted invasive species. This means that the plant is already established in most of the state and therefore complete eradication is unlikely, but a permit is still required to transport the plant. In either state, the uncontrolled presence of purple loosestrife threatens the future of North America'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. Because the *Galerucella* beetle does not cause any threat to native plants in North America, it was introduced 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 because they need the plant to live, but instead are used to keep the invasive plant in check.

There are two species of *Galerucella* beetle that are used for biocontrol in North America: *Galerucella californiensis* and *G. pusilla*. The adult forms of both beetle species are golden-brown in color and typically grow to 4mm in size. The beetles 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.



An adult *Galerucella* beetle on a leaf  
Photo provided by Katrina Scheiner, USFWS

## Overview

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As a volunteer for the purple loosestrife biocontrol volunteer science project, you will be helping to protect and preserve the native plants of Minnesota and Wisconsin 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.

With the support of the Conservancy, you will be expected to:

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

## Calendar of Events

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Event	Date	Description
Purple Loosestrife Rootstock Digging	Beginning of May 2024	Volunteers will help dig and pot purple loosestrife rootstock for use in the biocontrol project. <i>Please note, this event is not required to attend to help raise the beetles.</i>
Beetle-Raiser Volunteer Training	Saturday, May 4th, 2024 & Saturday, May 11th, 2024	Beetle-raising volunteers are <b>required</b> to attend one of the scheduled volunteer training sessions, where they will learn about project set-up and weekly duties and receive their beetle rearing kits.
Conservancy Beetle Release Days	Mid-July to Mid-August 2024	These are planned mass release days that are intended to release the beetles raised into priority purple loosestrife infested areas within the St. Croix River watershed. Dates TBD, depending on weather/volunteer availability.

## Purple Loosestrife Rootstock Digging

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The host plants used for beetle rearing in this project come from already established populations of purple loosestrife in the St. Croix watershed. The Conservancy will host a rootstock digging event in the spring to collect plants to be used for the project. A permit is required to move purple loosestrife in both Minnesota and Wisconsin, which the Conservancy will have for digging rootstock on the designated days. Beetle rearing volunteers are advised not to collect purple loosestrife plants on their own, unless applying for an individual permit. Volunteers are, however, encouraged to participate in the rootstock digging day, although it is not required in order to participate in the beetle rearing project.



A volunteer stands in ankle deep water and holds up purple loosestrife rootstock during the purple loosestrife rootstock digging day

Photo provided by Sierra Stukenholtz, Wild Rivers Conservancy

## Set-Up

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Volunteers will receive a beetle rearing kit with all necessary supplies during the volunteer training day in May. Beetles will be distributed at a later date once the plants have had a chance to grow. Your kit will include: a kiddie pool, 5 potted purple loosestrife plants, netting, hair ties with numbered tags, bungee cords, a clothesline, bamboo poles, and (eventually) *Galerucella* beetles.

Start by finding a spot to place your beetle rearing kit. 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 to make it easy for you to water your plants throughout the project, as well as space to hang up the provided clothesline. Hang the clothesline so it is hanging at least 6 feet above the ground and place the kiddie pool underneath. 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. Bamboo stakes will be available for pick-up during the volunteer training day.

Then, working on one plant at a time:

- Place one end of a sewn netting tube over your plant and secure it tightly to the lip of the pot with a bungee cord. It is important to ensure a snug fit on the netting to keep the beetles inside once they are added.
- Close off the top end of the netting with a hair tie.
- Place all pots in the kiddie pool and attach the top of each piece of netting to the clothesline or poles using the hair tie 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 (which are pre-drilled for convenience).

Plants may require watering multiple times a week, depending on rain and how thirsty your plants are. You will know when it is time to replenish your plants' water supply when the water level in the kiddie pool has depleted  $\frac{1}{2}$  inch 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 (<https://wildriversconservancy.org/get-involved/biocontrolproject/>). This form is used to keep track of each plant's growth and, eventually, to track the growth of the beetles once they are added to the plants.



Potted purple loosestrife plants covered in netting and arranged in kiddie pools  
Photo provided by Friends of North Pikes Creek Wetland



Potted purple loosestrife plants covered in netting and arranged in kiddie pools  
Photo provided by Golden Sands RC&D

## Adding Starter Beetles

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Purple loosestrife plants are ready for beetles to be added to them 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 through the opening in the netting 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** after the beetles are added to the plants. A photo of the completed form can be emailed to [myoung@wildriversconservancy.org](mailto:myoung@wildriversconservancy.org).

Once added, the starter beetles will begin to reproduce and lay small clusters of spherical eggs (<1 mm in size) on the leaves. Larvae will hatch from the eggs 2-3 weeks after the eggs are laid. The larvae are yellow with black bands and are 5-6 mm in size. They will eat the purple loosestrife leaves/foilage before burrowing into the soil to pupate and emerge as adult beetles.



Galerucella beetle larvae feeding on a purple loosestrife plant  
Photo provided by Thomas Boisvert

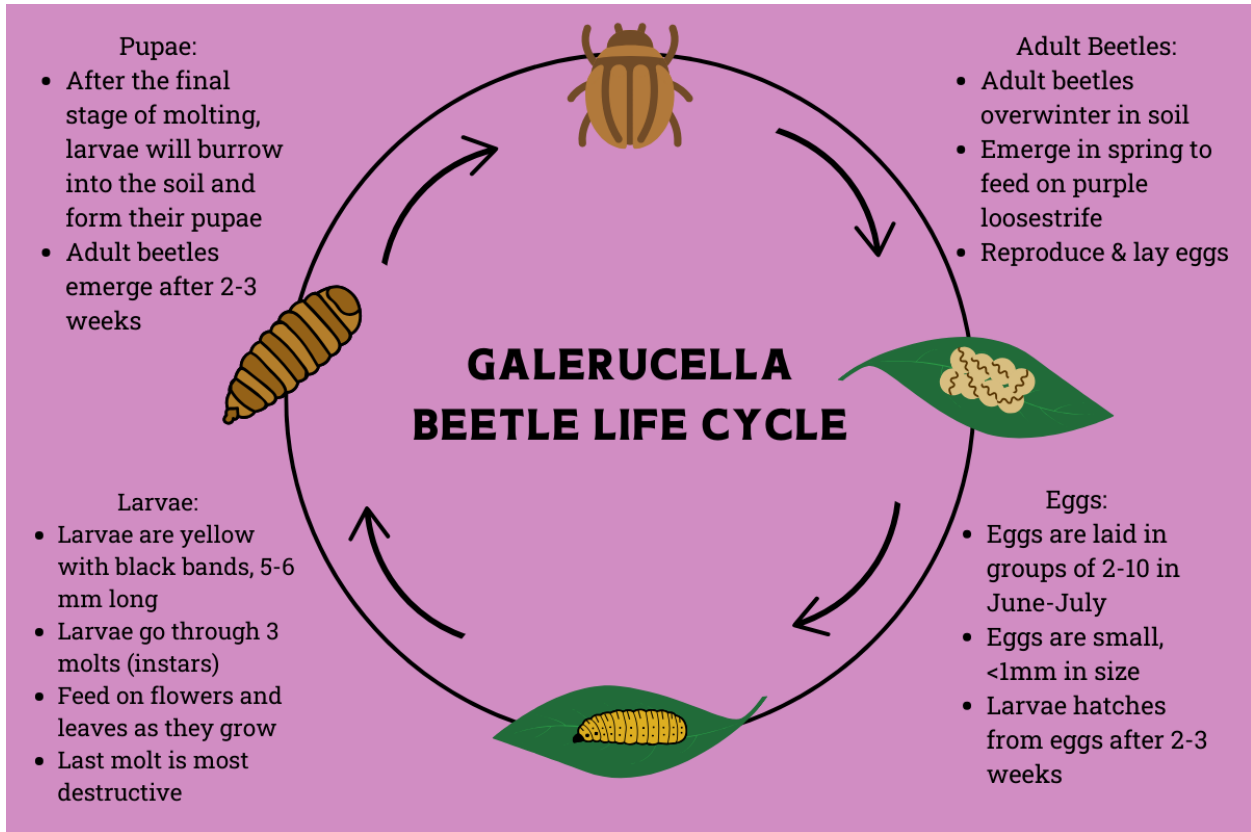


Sometimes, so many larvae will hatch that they will begin to eat the plant too quickly and deplete their food source, so mid-week checks at this time can be valuable to prevent larval death. This will also help keep track of water needs. **If you notice severe declines in your plant health, such as full plants of dead brown leaves or stems, please do not hesitate to contact Maria Young, invasive species coordinator, by emailing [myoung@wildriversconservancy.org](mailto: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 feeding damage from beetles and larvae. Feeding damage is an anticipated result of adding the beetles to the plant. However, we don't want the beetles to be eating the plant so much that it is to their own detriment. Forms can be found on the Purple Loosestrife Biocontrol Project webpage (<https://wildriversconservancy.org/get-involved/biocontrolproject/>).



Galerucella beetle larvae damage on a purple loosestrife plant  
Photo provided by Katie Sickmann



Galerucella beetle life cycle  
Graphic provided by Maria Young, Wild Rivers Conservancy

## Plant Care

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Watering 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. As stated before, plants may require watering multiple times a week, depending on rain and how thirsty your plants are. You will know when it is time to replenish your plants' water supply when the water level in the kiddie pool has depleted ½ inch below the drainage holes.

## Releasing Your Beetles

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Most beetles are ready to be released any time from mid-July to mid-August. When your purple loosestrife plants are completely eaten through and have brown, crispy leaves, you will know that it is time to release your beetles. At this point, the Galerucella beetles will be gathering in large groups at the top of the net, eager to escape and find more food. Be sure to

contact Maria Young at [myoung@wildriversconservancy.org](mailto:myoung@wildriversconservancy.org) when you start to notice this—your beetles will need to be released soon.



A purple loosestrife plant that has been completely eaten through by Galerucella beetles  
Photo provided by Brooke Sonnek, UMN Extension



Beetles gathering at the top of the net used to cover a purple loosestrife plant, indicating they need to be released soon

Photo provided by Sierra Stukenholtz, Wild Rivers Conservancy

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 (dates TBD), 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. If you select option 1 (participating in a Conservancy beetle release day) or option 2 (have Conservancy staff release beetles for you), more information will be emailed to you regarding plant drop off information as the day approaches.

No matter which option you choose, when the day comes to release/drop off your beetles, you will first need to transport your plants and beetles. To do this, start by removing the plants from the kiddie pool and placing them in the transport vehicle. Consider laying down a tarp/garbage bag in the vehicle to collect any excess water or seeds/flowers. If any excess seeds/flowers do fall onto the tarp, be sure to properly dispose of them. For information on how to properly dispose of noxious weeds in Minnesota, please visit <https://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/disposalnoxweed>. For information on how to properly dispose of invasive weeds in Wisconsin, please visit <https://dnr.wisconsin.gov/topic/Invasives/control>. When transporting your plants and beetles, it is important to **keep the netting on the potted plant until you get to the release site**. This will prevent the beetles from escaping, as well as prevent the spread of purple loosestrife flowers and seeds. If plants are being moved in a trailer or open truck bed, be sure to lay the plants down flat to prevent losing any while driving to the release location.



Transporting purple loosestrife plants and beetles in a boat by laying the plants down flat  
Photo provided by Katie Sickmann

If you select option 3 (to release your beetles on your own at a pre approved location), you will receive a follow-up email for more details about the release site you are interested in.

Some requirements for a beetle release site are:

1. The site must have a minimum of 50 purple loosestrife plants present.
2. The purple loosestrife plants should be growing close together (as opposed to growing widely scattered).
3. The site should not have the presence of previous beetle damage so as not to overwhelm the system and cause beetle fatality.

If the site you are interested in releasing at is public land or private land owned by another, landowner permission will need to be acquired as well, so keep this in mind.

Conservancy staff will evaluate the site based on the above criteria and you will be notified if your site is approved. On the day of release, transport your plants to the approved release location with the nets still on to prevent the beetles from escaping. Remove the plants from the vehicle and set them next to the purple loosestrife plants present at the release site.

Then, remove the nets from the pots by undoing the bungee cord holding the net to the base of the pot. Be sure to also undo the haritie closing the other end of the net. Next, gently turn the netting inside out and shake all beetles from the net onto the new plants. Most beetles will fall easily from the netting, so ensure you are shaking the netting directly over the new plants. Other beetles may want to stick onto the netting, in which case you can gently brush them off the netting.

After releasing the beetles into their new home, remove the plants from the pots and evenly spread the plants throughout the release location, placing each plant next to a free-growing plant. The entire purple loosestrife plant will be left behind in the new location to ensure that any larvae or adult beetles left on the plant or in the soil will be released. When placing the plants, ensure they are **not directly submerged** in water so as to prevent any remaining larvae from drowning. 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 on the new plants. Then, fill out the Purple Loosestrife Biocontrol Volunteer Science Project Beetle Release form, which will be emailed to you once your site is approved for release. Be sure to record 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). Coordinates can also be taken using a handheld GPS unit, which are available for check-out at the Conservancy office (Appendix 3). Please email the completed beetle release form to [myoung@wildriversconservancy.org](mailto:myoung@wildriversconservancy.org).

Be sure to properly decontaminate all footwear worn during beetle release to prevent the spread of seeds and flowers. This can be done by brushing off gear using a handheld boot brush (provided with your rearing kit) and rinsing with clean water before heading home. For more information, check out the Minnesota Department of Natural Resources page on preventing the spread of invasive species on land at [https://www.dnr.state.mn.us/invasives/terrestrial/prevent\\_the\\_spread.html](https://www.dnr.state.mn.us/invasives/terrestrial/prevent_the_spread.html).



Transporting beetles and plants during Galerucella beetle mass release day  
Photo provided by Sierra Stukenholtz, Wild Rivers Conservancy

## Troubleshooting

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Q: What do I do if, after the larvae hatch, I see an extreme decline in the health of my purple loosestrife plants, such as entire plants of dead brown leaves and stems?

A: Contact Maria Young at [myoung@wildriversconservancy.org](mailto:myoung@wildriversconservancy.org), additional plants may be needed to keep larvae alive.

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, whenever the water line in the kiddie pool depletes  $\frac{1}{2}$  inch below the drainage holes. 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 Maria Young at [myoung@wildriversconservancy.org](mailto:myoung@wildriversconservancy.org) if you are interested in releasing the beetles on your own as opposed to releasing them on a group release day. The Conservancy will evaluate the proposed release location. If approved, you will receive the beetle release form, which is to be filled out and submitted once you release your beetles.

## Appendix 1: Gathering Coordinates Using a Compass App

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1. Stand still in the location you are trying to record, open up your smartphone/tablet and click on the compass app. Most smartphones already have a pre-loaded compass app. If that is not the case, be sure to download one from the app store.
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 1).
4. Record these coordinates on your beetle release form.

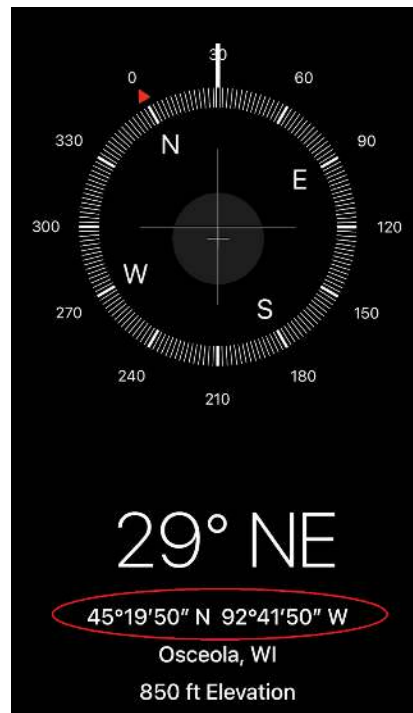


Figure 1

## Appendix 2: Gathering Coordinates Using Google Maps

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1. Download the Google Maps app in your app store and open the app once downloaded.
2. Locate yourself on the map (should be represented by a blue dot) (Figure 2).



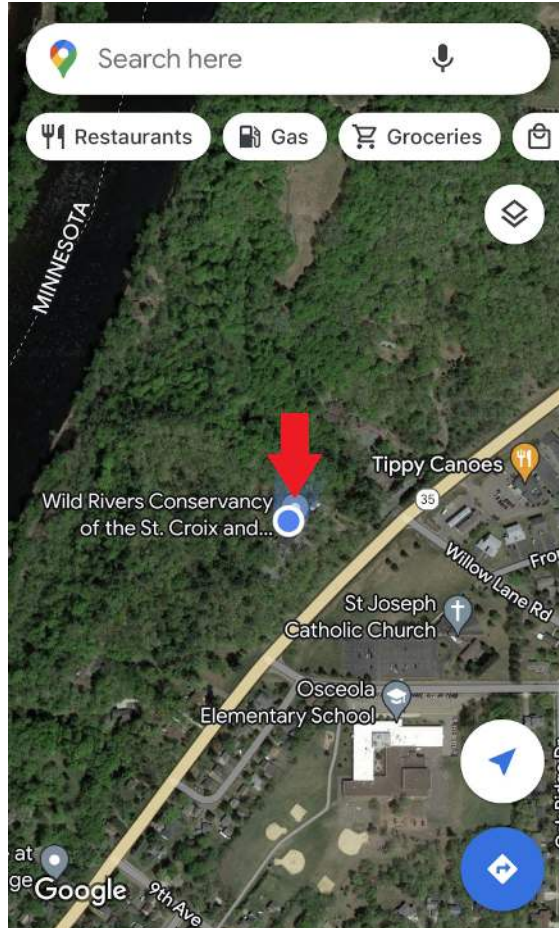


Figure 2


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 3).

## Dropped pin

Near Wild Rivers Conservancy of the St. Croix and Namekagon, 1015 N Cascade St, Osceola, WI 54020

1 min



 Measure distance



 88J3+656 Osceola, Wisconsin 

(45.3305390, -92.6971151)

Figure 3

5. Record these coordinates on your beetle release form.

### Appendix 3: Gathering Coordinates and Marking a Waypoint Using a Garmin GPS Device

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1. Turn on the Garmin by pressing and holding the power button on the right side (Figure 4).



Figure 4

2. Using the thumbstick controller, navigate to “Mark Waypoint” and select it by pressing down on the thumbstick controller button (Figure 5).



Figure 5

3. Once in the “Mark Waypoint” selection, you should see coordinates in the box labeled “Location” (Figure 6). Use these coordinates to fill out your beetle release form.



Figure 6

4. To finish creating the waypoint, navigate to the bottom of the screen using the thumbstick controller and click the “Done” button by pressing down on the thumbstick controller (Figure 6). This will save your waypoint.



Figure 6

## Questions?

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Contact Maria Young, Invasive Species Coordinator

Email: [myoung@wildriversconservancy.org](mailto:myoung@wildriversconservancy.org)

Phone: 715-483-3300 ext. 21