

NORTH SHORE WEED WATCHERS HANDBOOK



**A project of
Sugarloaf: The North Shore Stewardship Association**

www.sugarloafnorthshore.org

This project is funded in part by the Coastal Zone Management Act, by NOAA's Office of Ocean and Coastal Resource Management, in conjunction with Minnesota's Lake Superior Coastal Program

ABOUT THE NORTH SHORE WEED WATCHERS PROGRAM

Welcome to the North Shore Weed Watchers volunteer citizen scientist team! You are part of an exciting new program hosted by Sugarloaf: The North Shore Stewardship Association with funding from the Lake Superior Coastal Program. Tracking invasive plants is an especially important way to protect our beautiful North Shore forests.

Invasive species – organisms that evolved in one area of the world and become problematic in other areas – are becoming increasingly worrisome. One reason for the concern is that we humans are major intentional and/or unwitting agents of transportation for these marauding plants and animals. How serious is the problem? What do we stand to lose? As renowned biologist E. O. Wilson states, “On a global basis...the two great destroyers of biodiversity are, first, habitat destruction and second, invasion by exotic species.” These invasive species aggressively overtake or displace native species, and their ecological and economic impacts can be enormous. Experts estimate the cost of invasive species to the US economy alone is over 135 billion dollars each year.

North Shore Weed Watchers is an innovative campaign whereby volunteer "citizen scientists" are trained to detect the arrival and dispersal of invasive species along the North Shore. The intent of the program is to empower the public to become involved as citizen scientists in order to more effectively slow the spread of harmful invasive species and reduce their environmental and economic damage. Citizen scientists can help detect invaders' arrival and dispersal in their own local areas. You will be working along the North Shore to help detect invasive plants and enter the data

into the detection database through a web-based data entry form. The data you collect will be mapped and shared with managers on the ground for use in weed management planning and eradication.

In addition, you will be learning to identify invasive species, use GPS units, and enter your detection data via the web. Your participation in this initiative will not only benefit the North Shore, but will also contribute to national efforts to map the distribution and spread of invasive species.

Goals of the North Shore Weed Watchers Program

In this program, we have several goals we hope to accomplish:

- Begin to develop a baseline map of targeted invasive species along the North Shore.
- Develop partnerships with regional resource management agencies to guide us toward sites where we can focus our detection and reporting efforts.
- Provide information to these partners that helps lead to the control and/or eradication of invasive species where possible, and through these connections, provide our volunteers an opportunity to help in these eradication efforts.

Volunteer Activities

Volunteers in the North Shore Weed Watchers program will be engaged in the following activities:

1. You will be trained in the identification and reporting of invasive species
2. You will conduct surveys in the field to observe and record the presence of targeted species
3. You will use GPS and digital cameras to confirm location and identification of targeted species
4. You will use the web to post data and images to an online database or you may send the data to Sugarloaf.

Volunteer Qualifications

In order to perform the activities cited above, volunteers should have or be willing to acquire the following skills:

1. **Field experience:** Hiking skills, field-worthiness, and ability to walk on uneven terrain are helpful.
2. **Technical skills:** Ability to use (or be trained to use) digital cameras, GPS units, and an online database.
3. **Background:** Some background in natural history with an emphasis on plant identification is helpful but not necessary.

4. **Other:** A desire to help stop the spread of invasive species.

Beyond Detection and Reporting

Finally, we hope that you will share what you learn with friends, family, and neighbors and take your interest to new levels. For those whose interest extends beyond early detection and reporting, we encourage you to form local partnerships with institutions and agencies that are doing eradication projects so that you might assist in the management of some of the species we track.

Instructions for Reporting an Invasive Plant Sighting in EDDMapS : Early Detection & Distribution Mapping System

A key component in an invasive species Early Detection, Rapid Response program is the development of species distribution maps. Entering and tracking locations of invasives within and between states can identify the “leading edge” of invasive plants heading our way. This gives each of us a chance to implement Early Detection and Rapid Response programs in our area to stop or minimize an invasive plant before it becomes a “kudzu” kind of problem and allow land managers and agencies to prioritize control needs and strategies.

The Early Detection and Distribution Mapping System or EDDMapS, is web based mapping system for invasive species distribution that is fast and easy to use and doesn't require GIS experience.

Gathering the information is as simple as taking pictures of the invasive plant and noting the location. Location information can be determined by taking the GPS coordinates on-site, or by using EDDMapS on-line map functions to locate the infestation.

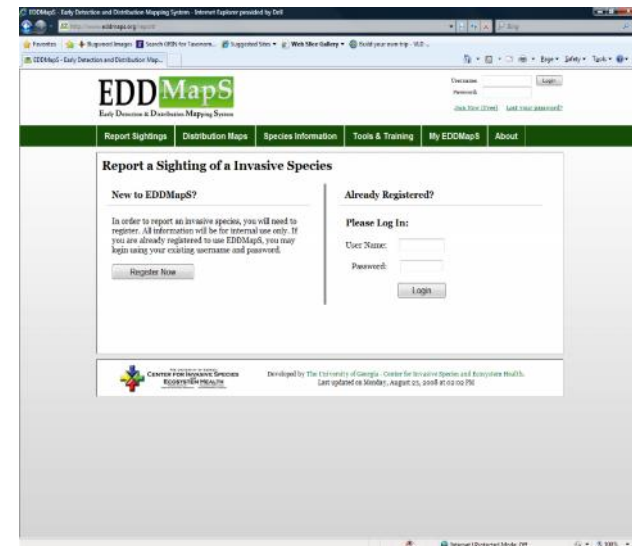
Using standardized on-line data forms, you can add specific information about the infestation and images that will then go to a database that aggregates data from other mapping projects and cooperators to display invasive species distribution for county level, state, and national level scales.

Step-by-step instructions to enter data and images into EDDMapS follow.

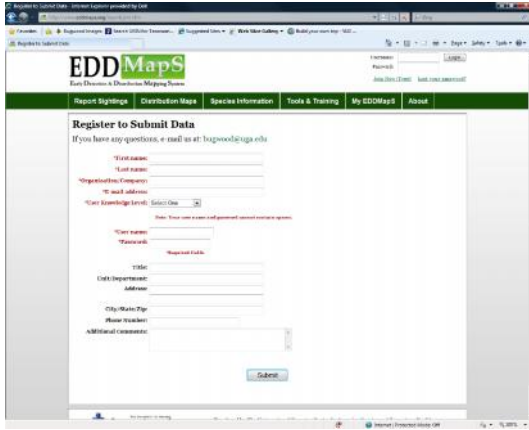
First step: Register as an EDDMapS user.

Go to the EDDMapS website (<http://www.eddmaps.org>)

Select “Report Sightings” from the menu bar.



Click the “Register Now” button



Fill out the form; then click the “Submit” button.



Once you have registered for EDDMapS, you will simply sign in to report an infestation. Go to the EDDMapS website (<http://www.eddmaps.org>) and select “Report Sightings” from the menu bar.

You are now ready to begin the reporting procedure.



State: Select the state for which you are reporting an infestation

You will see a reporting form with a number of fields. If you place your cursor over the (?) at the end of each field you will get more information about that field.

You might want to take a few minutes the first time you reach this page to explore the information available at each (?).

Most of the fields have arrows for drop down boxes with a list of possible choices for that field.



Beginning at the top, we will first look at Species: Pest

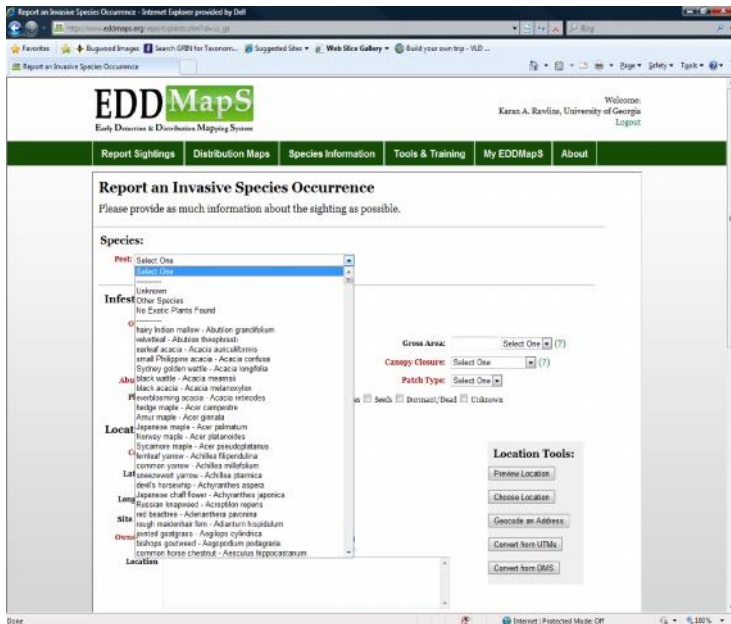
Species:

Pest: If you click on the arrow on the right, you will find a drop-down menu with a list of plants.

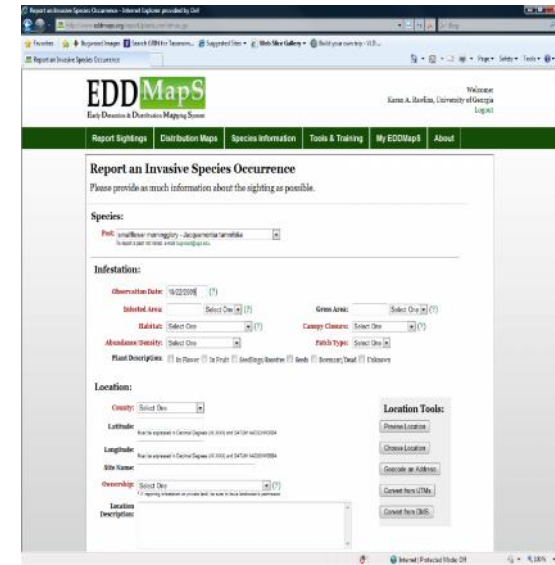
If the plant you have found is not listed, choose “Other Species.” If you are not sure what the species is, choose “Unknown.”

If you select “Other Species” email the Center for Invasive Species and Ecosystem Health at bugwood@uga.edu with the name of the invasive plant not listed on the drop-down menu.

Note: Plants are listed in alphabetical order by scientific name, although the common name is also listed. Go to the *Species Information* tab and click on the *Subject Name* column to sort the list alphabetically by common name.



Infestation:



Observation Date: Enter the date you observed the pest plant in the format mm/dd/yyyy.

Note: If the date is entered in a different format it may cause an error message to appear.

Infested Area: Enter only the area that is actually occupied by the invasive species. Do not forget to choose the unit area from the drop-down menu, be it acres, hectares, square feet, or square meters.

Gross Area: Estimate the general area within which the invasive species is found. This total area may include portions that are not occupied by this species. Again, choose the unit area from the drop-down menu.

Note: This is just to give us or a land manager an idea of the area infested. Your best estimate is fine.

Habitat: From the drop-down menu, choose the description that best describes the habitat within which the invasive plant occurs. If you do not see the habitat listed, choose “Other.” If selecting “Other” email bugwood@uga.edu to explain the unlisted habitat so it can be added to the drop-down menu.

Canopy Closure: Estimate the area of ground covered by foliage of the invasive species.

Abundance/Density: Choose the most appropriate answer from the drop-down menu: Single Plant, Scattered Plants, Scattered Dense Patches, Dense Monoculture.

Patch Type: A single plant or very small group is a point. A fence line or riverbank infestation is linear. Any other area is a polygon.

Plant Description: Check all that apply by clicking the box to the left of each description: in flower, in fruit, seedlings/rosettes, seeds, dormant/dead, unknown.

County: Choose the county where the plant was observed from the drop-down menu.

Latitude/ Longitude:

There are a couple of ways that you can get this information. You can GPS the point using a GPS unit. Make sure you set your GPS unit to “NAD83.” Be sure to place a minus sign in front of your longitude number. Select the “Preview Location” button to make sure your location is correct.

Alternatively, you can select a location using an online mapping system. Select “Choose Location” to the right under, “Location Tools.” A Google map will appear.

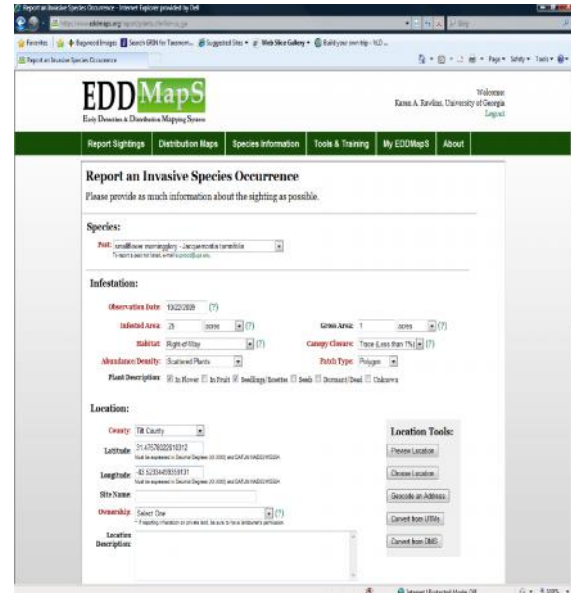
You can choose the normal map view, a satellite image, or a hybrid of the two. Click on the map in the general area of the infestation and you will see a pinpoint at that spot.

Increase the magnification around the point by clicking the “+” sign on the upper left hand corner of the map until you have zeroed in on the site where the infestation was found.

You can adjust the location of the pinpoint by clicking on the appropriate spot on the map. Each time you click, a new pinpoint will appear. When the pinpoint is in the correct spot, select “Update Report Form.”

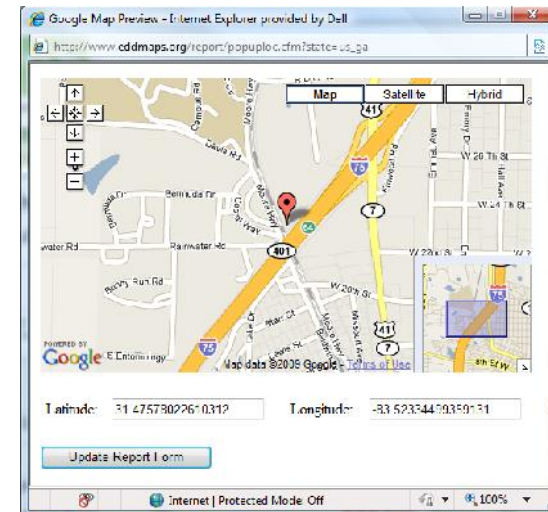
You will see the correct latitude and longitude entered for you.

Note: Other tools that may be helpful to advanced users are located under “Location Tools.”



The screenshot shows the EDDMapS web application interface. The main heading is "Report an Invasive Species Occurrence". Below this, there are several sections for data entry:

- Species:** A dropdown menu with "Red: *Cardinalis virginiana*" selected.
- Infestation:** Fields for "Observation Date" (12/22/08), "Infested Area" (25 acres), "Known Area" (1 acre), "Substrate" (Edge of Field), "Canopy Closure" (Tree Less than 75%), "Abundance/Density" (Scattered Plants), and "Plant Type" (Pioneer).
- Plant Description:** A list of plant types with checkboxes: "In Flower", "In Fruit", "Seedlings/Seedbeds", "Seeds", "Overmatted Dead", and "Others".
- Location:** A dropdown for "County" (Tulsa County), and fields for "Latitude" (31.47578022610312) and "Longitude" (-83.52354479359131). There is also a "Site Name" field and an "Ownership" dropdown.
- Location Tools:** A panel on the right with buttons for "Choose Location", "Choose Location", "Search an Address", "Cancel from URL", and "Cancel from OSM".



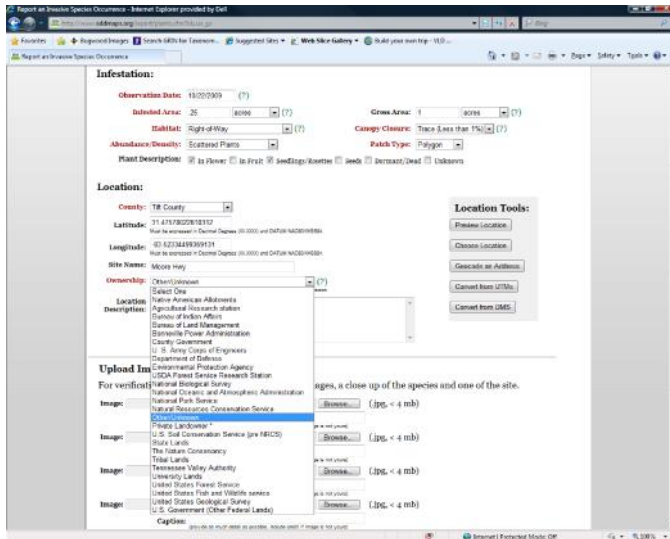
Site Name:

If desired, a descriptive name can be given for the site. For example, “Sugarloaf Cove parking lot.”

Ownership:

From the drop-down menu, select the ownership type for the property on which the invasive plant was found.

Remember, you need permission from landowners to be on private property and map invasive plant locations on private property.



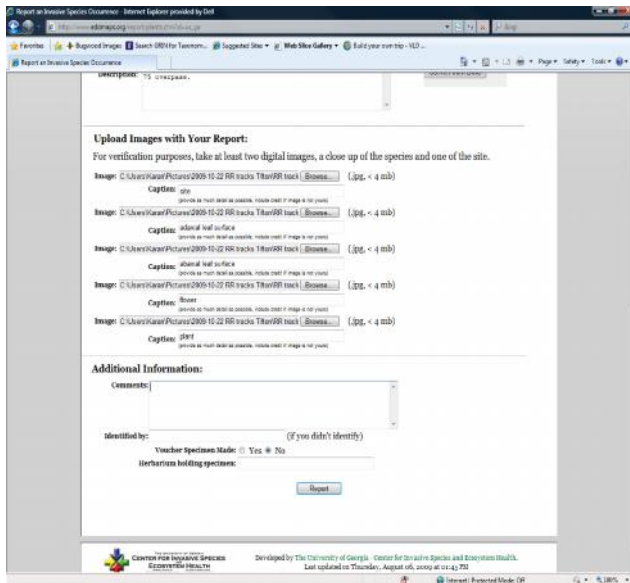
Location Description: Add any information that would aid in relocating the infestation.

Upload Images with Your Report: For verification purposes, and to help relocate the infestation images may be uploaded here.

Image: Simply click “Browse” and navigate to the picture on your computer. Click “Open” and the image location will be entered for you. Do this for up to five images. Images must be JPGs and smaller than 4 megabytes in size.

Caption: Add a caption to describe each image. Provide as much detail as possible. Include the photographer’s name if someone other than you took the picture.

Image recommendations: Appropriate images include leaf shape and arrangement, flowers, fruit, roots, and unique features like thorns. Whole plant images showing the habit of the species are also appropriate when included with close-up images. Use a tripod when possible. Take photos with the sun behind you.



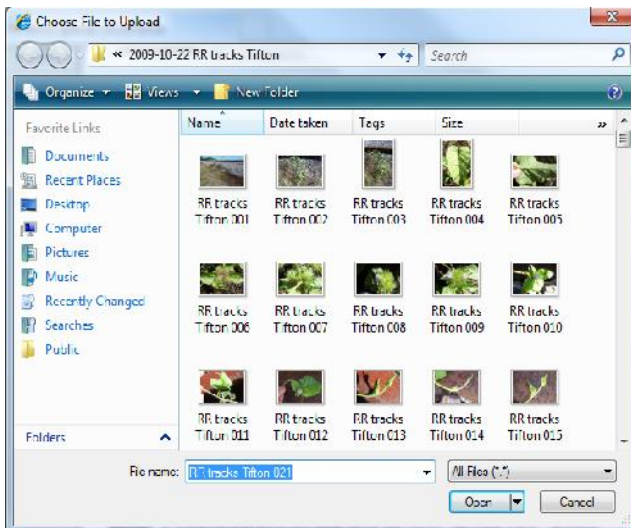
Additional Information: This area is useful for reports created from herbarium specimens or for which specimens were collected.

Comments: Add any additional comments regarding the voucher specimen, if one was collected. This may include information found on the label.

Identified by: If someone other than you collected a voucher specimen of the invasive plant at this site enter his or her name. Otherwise, leave blank.

Voucher Specimen Made: If a voucher specimen was created from this sighting click Yes.

Herbarium holding specimen: Enter the name of the herbarium where the specimen is housed. (N/A)



Sugarloaf is not asking you to collect the plant.

Herbarium specimens are not required for submitting data to EDDMapS. They add validation to the data you are submitting.

Enter the Report: Select “Report.” The data will be entered into EDDMapS and any images will be uploaded at this time.

Congratulations! You have completed a successful entry into EDDMapS

You can now click on My EDDMapS from the selection bar at the top of your screen.

This will take you to your personal EDDMapS page with all your stats.

From this page, you can check what you have entered for accuracy.

You can also keep track of how many reports you have collected and how many different species you have reported.



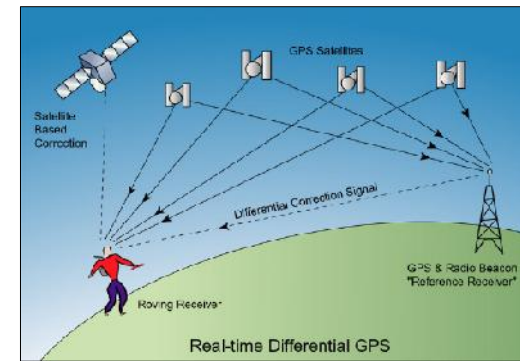
Adapted from: Barger, C.T. and K.A. Rawlins. 2009. Module EDDMapS. The University of Georgia Center for Invasive Species and Ecosystem Health, Tifton GA, BW-2009-102. 14p.

USING A GPS UNIT

What is GPS?

GPS stands for Global Positioning System. It is a satellite-based navigation and positioning system originally developed for US military applications and, in recent years, made available for civilian use world-wide.

How does GPS work?



GPS measures the time difference between a signal sent from a satellite with a known position to a ground receiver. Four such signals will very accurately determine the position of the receiver. Twenty-four satellites, in very stable orbits at about 11,000 miles altitude constitute the heart of the system.

Your hand-held receiver searches for the signal from each of these satellites and in some cases, the signal from a satellite in geosynchronous orbit at about 23,000 miles altitude. It will read signals from any satellite within direct line of sight above the horizon. Signals from satellites 15 degrees above the horizon or higher will typically yield signals usable for accurate positioning.

GPS Accuracy

Most GPS receivers will generate a reasonably accurate position within a minute or two – often much faster. While GPS “fixes” are quite good, positional inaccuracy is great enough in most cases that you will want describe in your site notes which side of the road you’re on (N,S,E,W) if you’re collecting data on a roadside.

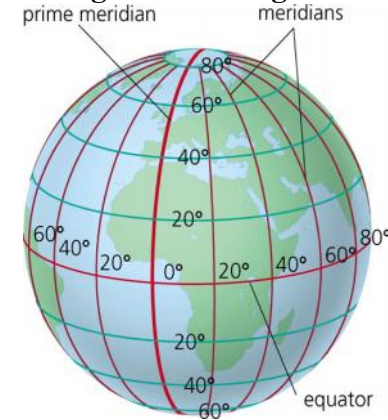
Setting Up Your Receiver

You will need to set up your receiver to display geographic coordinates in decimal degrees. GPS receiver menus often have this setting in the *Units* tab. On Garmin Dakota 10 receivers, decimal degrees appear as the menu choice, hddd.ddddd. Other GPS receiver models will feature slightly different set-ups, but all are similar.

Select “NAD 83” in the map datum category of your system set-up menu. This refers to the system that GPS uses to match coordinates with ground-based mapping systems. It will sometimes be listed as “WGS84/NAD83.” The difference of plotted points using the two systems will be of no consequence on this project.



Reading and Recording Decimal Degrees



Geographic coordinates historically were recorded in the format, degrees-minutes-seconds of latitude measured north and south and originating at the equator and degrees-minutes-seconds of longitude measured east and west and originating at the prime meridian, which runs through Greenwich, England.

Thus, a point determined to occur at Sugarloaf Cove Nature Center would appear as 47° 29' 14.18" N, 090° 59' 7.7" W. Using decimal degree notation, it is written 47.4874°N, 090.9852°W. All points in Minnesota are North latitude and West longitude. We use the decimal degree format for ease of data entry and for use with online mapping applications.

Degrees of longitude are recorded as negative numbers for positions located in the western hemisphere. Thus, many mapping and data entry applications require the entry of a minus sign before the longitude value in order to differentiate it from a point in the eastern hemisphere the same distance from the prime meridian.

When entering data for the North Shore Weed Watchers program online, you must include the minus sign. Further, while properly written as a three-digit number (e.g. -097), many mapping and data entry applications require dropping any leading zeros. It is not necessary to enter the leading zero for degrees of longitude, though if you do, the database will accept the entry but drop the zero when displayed.

*Adapted from the Texas Invasives Program,
www.texasinvasives.org.*

DIGITAL IMAGING

Digital images will be used to document your species observations. These images will be stored in the database along with the text and location data to allow an expert to validate your data submission.

Before you leave - Check and inventory all of your photographic equipment before going into the field. Make sure your camera is loaded with fresh batteries and that you are carrying fully charged spare batteries as well. Be sure you have plenty of available memory for the amount of photography you plan to do on your outing. It is generally a good idea to remove old images from your memory cards before beginning a new field trip. Finally, check your camera's settings, making sure its time/date, auto/manual, flash, aperture, and shutter speed settings are correct.

When you are in the field, you will need to take one or more images to go with each species observation. It is essential that you can associate the images you take with the species observation when you are ready to do the data entry. The data collection sheet has fields to record the camera's automatically assigned image names for the **close up** images. Be sure to record the image filenames on the collection data sheet while you are in the field.

Close Up Image – This image will help the scientist verify the species type. When taking a close up picture for species id, use the back of a clipboard or some other object as a solid background. If your close up shot is less than ~40cm from the item you should use the camera's macro mode (usually a flower

symbol) but this may differ on different camera models. In macro mode, frame your subject and press the shutter halfway to let the camera focus. Continue pressing the shutter button to take the picture. Take 2-3 close up images and record the file names on your collection datasheet. Later, when you are at your computer, you will choose the best one to upload to the database.



Easily validated



Not easily validated

Image Resolution – The images you take will be used in a web format to help experts validate your data. The image resolution required for this purpose is a 1024x768 and medium quality. Larger images at a higher quality setting add no extra value and will only serve to slow the image upload process.

Image Orientation – Resist the urge to take **portraits**. In order for the images to be processed correctly during image upload, all images must be taken in **landscape** orientation.

Getting the pictures off the camera - When you return from the field and are ready to enter your data, you need to be able to browse to your pictures with “My Computer”, “Windows Explorer” or the “Finder”

Method 1 - Connect the camera via a built in USB port to the computer. When they are connected and you turn on the camera, your computer will recognize it as another drive and allow you to view the picture. Note: this uses the camera’s batteries, so be sure to turn the camera off when not in use.

Method 2 - Take the card out of the camera and insert it into a card reader. The reader plugs into a USB port on your computer. If your computer is Windows 2000, XP, or 7, or Mac OS X, the reader will be automatically recognized and show up as another drive.

Post Production - Please review your images before uploading them to the website. If you have taken multiple images, select the one image that you believe best illustrates the species observation. It is not necessary to do post-production work on your images. As a rule, it is better to submit the images just as you shot them. An exception, if cropping will reduce confusion about what the subject of the image is supposed to be, then crop the image as necessary, but maintain the image’s aspect ratio when cropping.

What to do with your images – Follow the instructions in the Data Entry section to upload your images to the EDDmapS website.

Good Pictures vs. Bad Pictures

The whole point of taking pictures for this project is to allow someone else to verify the identity of the species that you're recording. Bad images are very difficult to validate; really bad images are impossible. While the type of photography you will be doing on this project is more technical than artful, many of the principles for good photographs still apply. It is usually a good idea to shoot multiple images of the same subject from different angles, distances and with different camera settings in order to ensure a suitable image for validation. Following are some general photography hints that will help you capture better images.

Wind – Windy conditions make for especially difficult photography, especially close-up photography. Do what you can to ameliorate the problems caused by strong winds. Early mornings and late afternoons generally are less windy than midday. Those times of day also offer the advantages of typically more favorable light for photography and usually more pleasant temperatures for the photographer.

Framing – Get the subject in the frame. It is very important to frame the critical recognition features in the image. While it is not critical to keep extraneous objects out of these images, it is nevertheless a good idea to minimize them as much as possible. Extraneous background objects can cause image interpretation problems in some cases, but more importantly, they can cause the camera to choose the wrong aperture and shutter speed if the objects have a substantial tonal difference.

Focus – Auto-focus is a wonderful feature offered by all modern cameras. However, it can cause serious problems, especially when making close-up images of plants with small or thin features. The camera will focus on what its program tells it is the most likely subject you wish to shoot. Very often, the camera ends up focusing on the soil or vegetation somewhere behind the subject you intended.

If you wish to use auto-focus, it is a good idea to use some technique to “trick” your camera into focusing on the intended subject. A *handy* object to use for close focusing is your own hand. While holding your camera with your right hand, extend your left hand to the plane of the photographic subject with your palm facing the lens. Depress the shutter-release on your camera to make it auto-focus on your hand and, while continuing to hold the shutter-release in the “half-down” position, turn the camera slightly to bring the subject into frame. Depress the shutter-release the rest of the way.

If your camera does not focus close enough for you to use your hand, you may wish to make a focusing subject on a stick to use for that purpose. Otherwise, you might consider using the manual-focus feature on camera and measuring the distance between the camera and subject. If you are going to manually focus your camera using the camera's built-in manual-focusing distances, it is a good idea to check those distances at home before going into the field.

Try to adjust your camera position so that, as much as possible, your subject lies on a plane parallel to the camera's focal plane – the photo sensor. Not only will more of your subject be in focus, but it is less likely that parts of the subject that lie in the foreground will cause focusing problems in the auto-focus mode.

Exposure – After focusing problems, the most common photographic fault encountered is with exposure. That is, creating an image in which the subject appears too bright or too dark. Backlit subjects will almost invariably appear to be dark. Always try to keep the sun at your back, or at least not behind the subject when taking your field photographs. If you have no choice other than to shoot a backlit subject, you will need to find a way to supplement the lighting on your subject artificially. One way is to use a reflector to bounce some of the sunlight back onto the subject. For close-ups, a sheet of white paper will often work well enough for this purpose. You can also use your camera's flash, but it is often tricky to get the exposure right. In addition, you will need to operate your camera's flash in manual mode to get it to fire when shooting into a bright light situation.

For close-ups, a handy trick to attain the proper exposure on your images is to use a "gray card" background. A gray card is a piece of poster board or paper that is of a neutral tone – somewhere near halfway between white and black. It does not have to be gray; blue brown and even green are also good colors. Your camera will choose an exposure setting based largely on the background behind your subject. By filling that background area with a "gray card", your subject is much more likely to be properly exposed.

Shutter Speed – As previously stated, winds can cause significant problems with creating good, identifiable images. If you are shooting on a windy day, it may be necessary to set your shutter manually to a faster speed. However, please realize that the faster the shutter speed you use, the less depth of focus your image will display.

Creating a physical barrier to block the wind is sometimes an option. You can also, remove the subject to a less windy position for the purposes of photographing it. However, if you shoot an image *ex situ* please note that fact in your datasheet comments.

Of course, low-light conditions can also cause problems, particularly for hand-held photography. If your camera sets its shutter speed to slower than 1/60 second in auto mode, you will need to either shoot your picture using a flash or attach the camera to a tripod. Don't assume that because the image looks fine in the LCD on the back of the camera that it will be identifiable when viewed at native size on the computer by the validator.

Flash – While your camera's flash can be a useful tool, more often than not its use will result in worse images than if you didn't use the flash. Close-up subjects are particularly prone to being overexposed because of the camera's internal metering and flash intensity adjustments. Further, the light from a built-in flash tends to "flatten" the features of your subject causing it to lose some dimension. However, in the situations described in earlier sections, the flash is your friend if used properly.

Adapted from the Texas Invasives Program,
www.texasinvasives.org

Plants to watch for:

- Glossy and Common Buckthorn
- Purple Loosestrife
- Leafy and Cypress Spurge
- Spotted Knapweed
- Canada Thistle
- Plumeless Thistle
- Bull Thistle
- St. Johnswort
- Japanese Knotweed
- Wild Parsnip

You may record any other species that you find. This is a list to get you started.