



Monitoring Invasive Plant Species

Citizen Based Monitoring Opportunities

Potential Role of Citizen Scientists

- Large data source that could fill data gaps
 - improve early warning of new invaders
 - improve spatial predictive models
- Cost efficient, maximizing limited resources
- Likely to collect data relevant to local conservation and management issues
- Access to lands restricted to professional scientists



Citizen-Based Monitoring Network of Wisconsin

- ◆ Who's Who of Monitoring
- ◆ Inventory & Monitoring Programs
- ◆ Monitoring Resources
- ◆ Activity Calendar
- ◆ Partnership Program
- ◆ Advisory Council
- ◆ Conference Information
- ◆ Projects in the News

WHAT'S NEW!

[Read about bat monitoring](#) going on at the Urban Ecology Center in Milwaukee, Kemp Natural Resources Station in Woodruff, and the UW Arboretum in Madison.

Welcome to the home page of the Citizen-Based Monitoring Network of Wisconsin! This website is a work in progress. Some of the pages are merely examples of what is to come. Please visit all of the pages that are listed in the left side bar and [give us your feedback](#).

Vision: By 2010 the network will disseminate and use information to educate residents to influence decisions that protect and improve our natural resources.

Mission: The WI monitoring network functions as a comprehensive stakeholder collaboration designed to improve the effectiveness of monitoring efforts by providing communications, resources and recognition in order to build and maintain the dynamic picture of our natural resources.

Background

- National Institute of Invasive Species Science
 - www.niiss.org
 - Major Partners: USGS, CSU, NASA
- Citizen Science Program (NSF)
 - Online tutorials
 - Monitoring protocols
 - QA/QC protocols
 - Customizable data entry forms
 - Cheap, easy to use digital field tools

How Can Citizen Scientists Monitor These Species in My Area?



Level 1 Vegetation Monitoring Protocol

- Tiered Monitoring Approach
 - Level 1: Collection of point, line, and polygon data with a GPS
 - Level 2: A simple plot-based approach; least cost and time required; collect general location and abundance information
 - Level 3: An approach for more experienced monitoring groups; incorporates more detailed species abundance and habitat information
 - Level 4: A far more detailed approach to mapping and modeling native and non-native species distributions, primarily for researchers; expensive and time-consuming

Level 1

Subjectively Sample Known Locations
(location, cover, area)

Opportunistic Samples of Unknown Locations
note presence/absence, cover, area

First Approximation Model

environmental envelope of presence/absence

logical strata, based on suitable habitats, major environmental gradients, or TM heterogeneity classes

identify information gaps (soils, other data)

Level 2

Add Additional Species And Auxiliary Variables
(height, disturbance, cover of abiotic variables)

Add Stratified-Random Sampling Component
to assess mean conditions within envelope

Second Approximation Model

Validate subjective data and refine Level 1 and 3 monitoring locations

Level 3

Add More Stratified-Random Samples

and/or

Add More Gradient Samples

Iterative Models

Validate all previous data
Continue to refine previous models as new information becomes available

Outputs: (1) Current and potential distribution models; (2) Priority sites for control and restoration; (3) Potential early detection sites; and (4) Probability and uncertainty analyses.

Level of Difficulty



Level 1 Monitoring Protocol



Level 1: Point, Line, and Polygon Data

- **Who?** Recorder's Name
- **What?** Plant Name
- **When?** Collection Date
- **Where?** Location

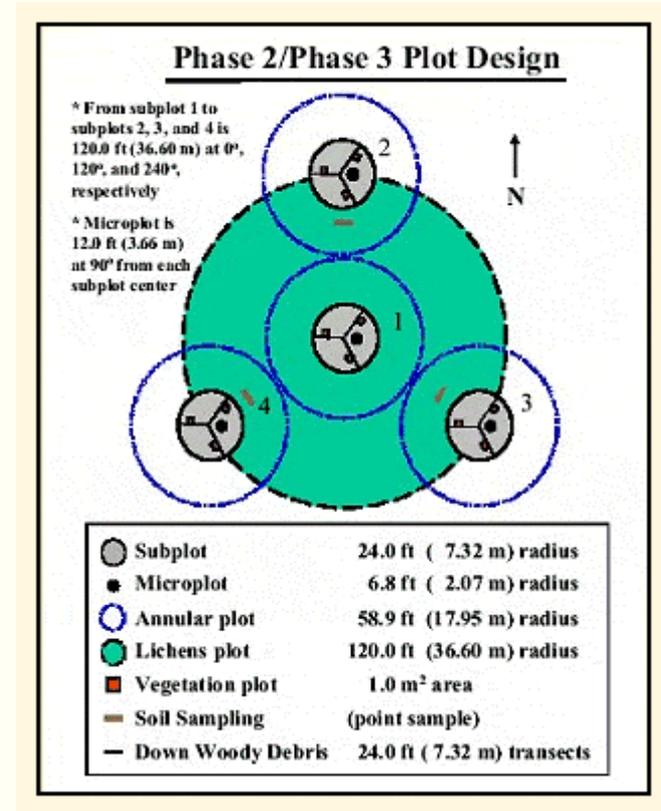
- Additional Information:
- North American Weed Management Association
 - www.NAWMA.org
 - provide minimum mapping standards

Level 2 Monitoring Protocol



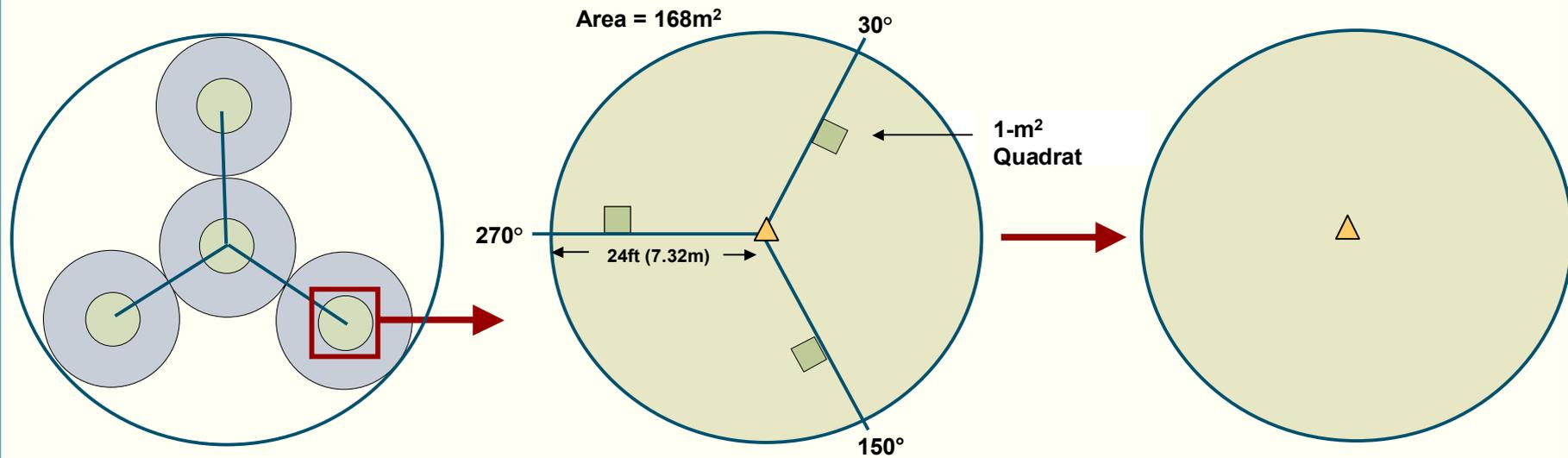
USFS Forest Inventory and Analysis

- ❑ Adopted in 1995
- ❑ Collects, analyzes, and reports info on the status, trends, and conditions of US Forests
- ❑ Includes all forest land in 50 states
- ❑ 20% of plots monitored in each state each year



See www.fia.fs.fed.us

Modified USFS FIA Plot



Levels 2 & 3: Barnett et al. 2007

Levels 1 & 2

Why Plots?

- ❑ Comparable to FIA plot size and shape
- ❑ Account for species absence
- ❑ Integrate data with remote sensing information
- ❑ Long-term monitoring in a consistent, comparable data set

Equipment Needed

- >10m tape (1)
- Marking flags (~10)
- GPS Unit
- Ground stakes (1)
- Paper Form, PDA, or Laptop to record data
- Reference materials (floristic keys, etc.)

Locate Plot Center

1. Subjectively or randomly locate plot center.

2. Enter the following information on form.

- Date
- Time
- Recorder
- Unique Plot Name
- Coordinates for Plot Center
- Projection: UTM or Geographic
- Datum: NAD83, NAD27, WGS84
- Accuracy: should be <10m to make a valid reading



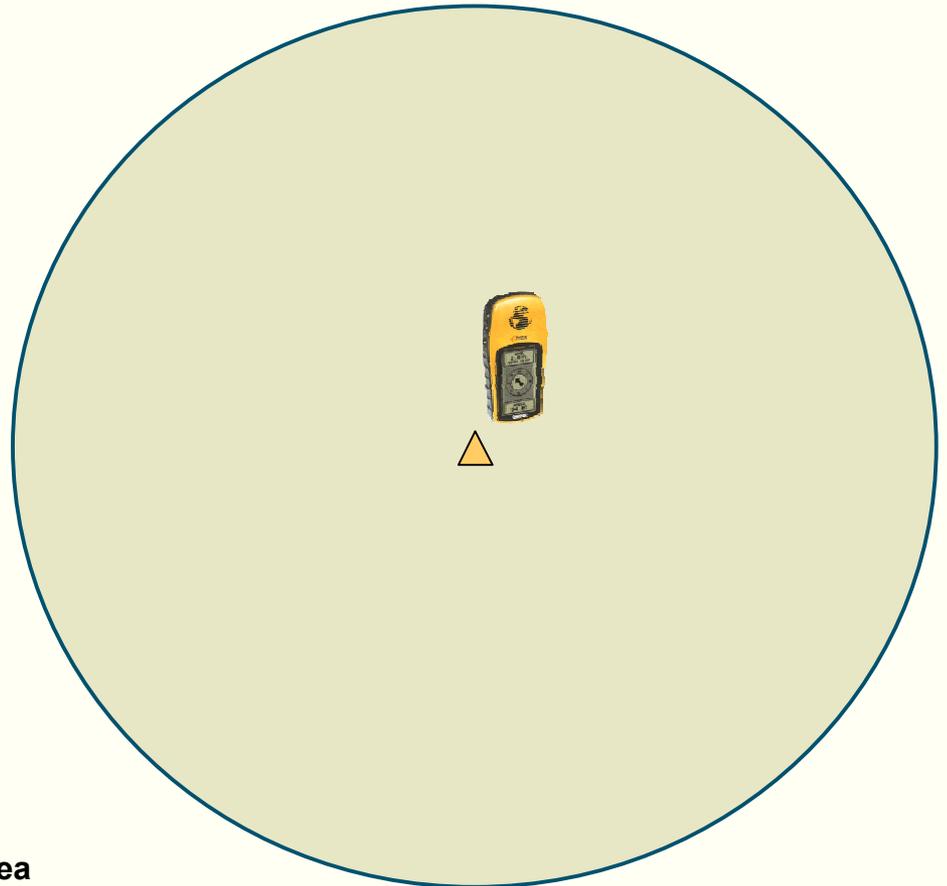
GPS



Stake

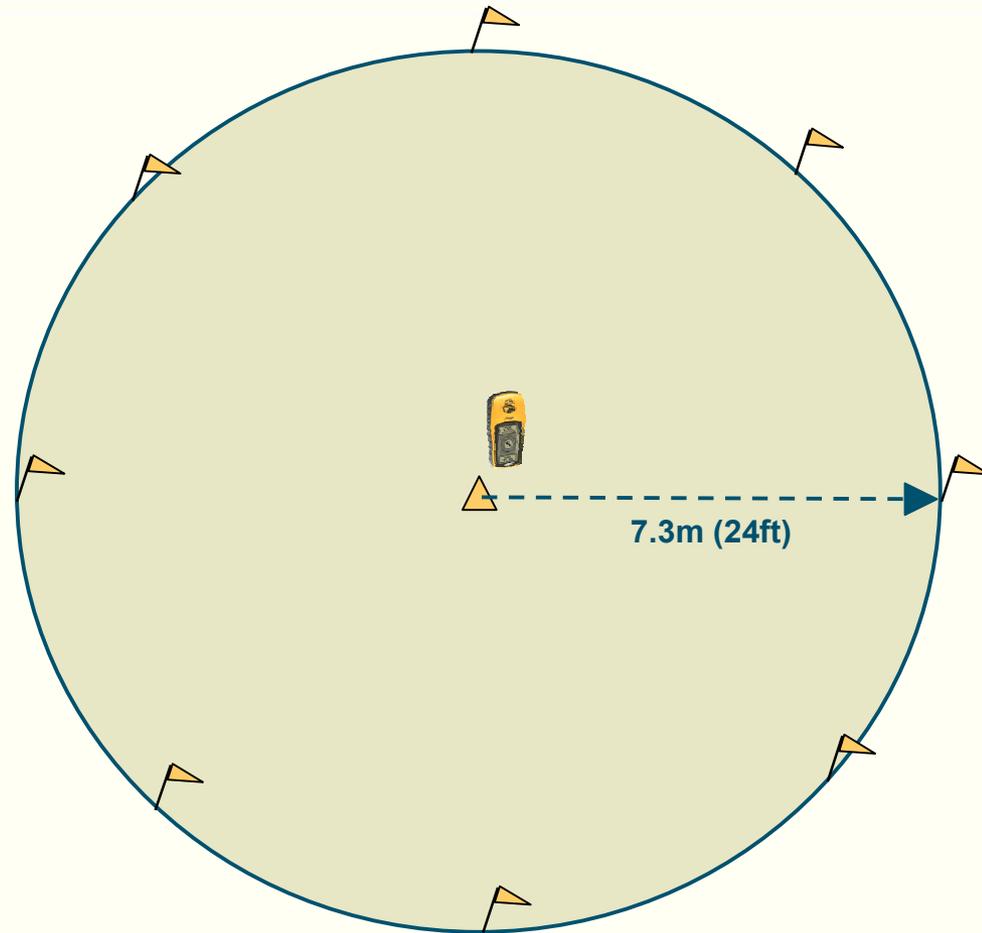


Plot Area



Define Plot Area

1. Mark the center of the plot with a stake.
2. Attach a 10 meter measuring tape to the plot center and measure out 7.3 meters in any direction.
3. Mark this location with a flag. Hold the tape while walking in a circle to define the edge of the circular plot while placing flags in the ground periodically to define plot area.



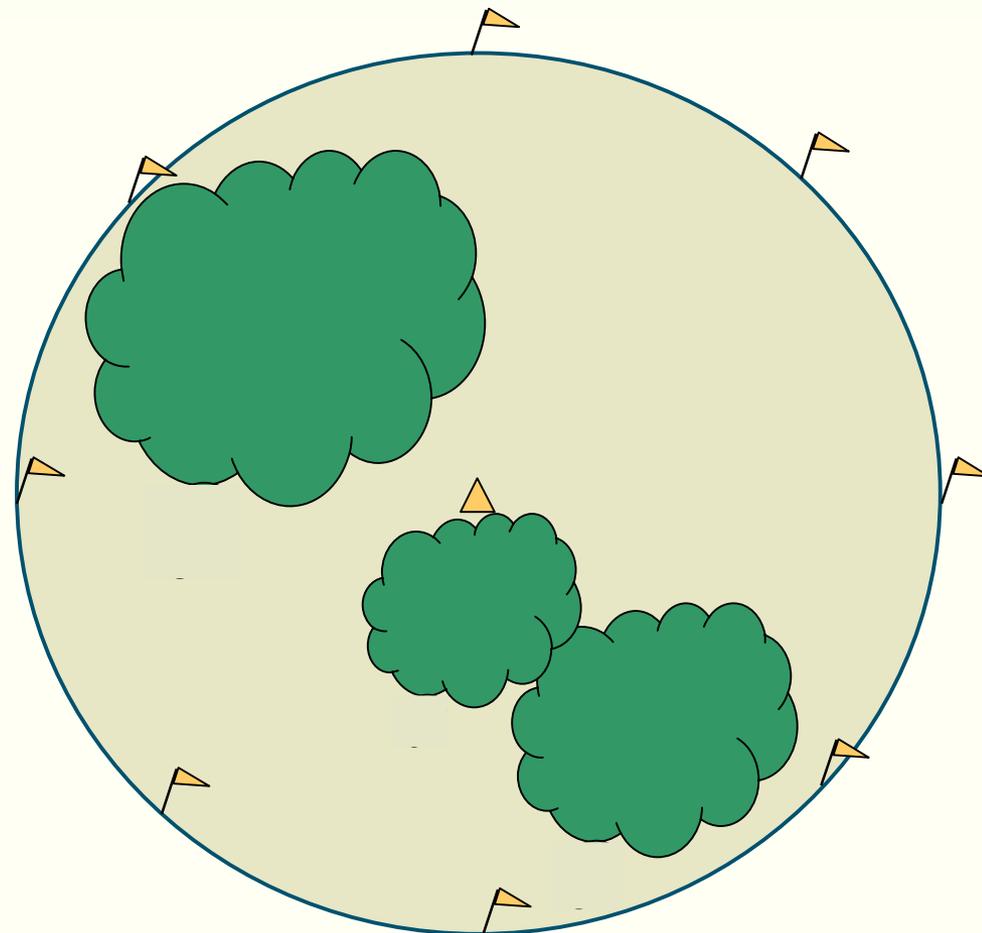
-  GPS
-  Flag
-  Stake
-  10 m Measuring Tape
-  Plot Area

Record Vegetation Data

1. Identify species of interest in plot area. Record and note degree of uncertainty in identification.

2. Mark all species in plot as present and estimate percent cover.

3. Mark all species of interest not in plot as absent.



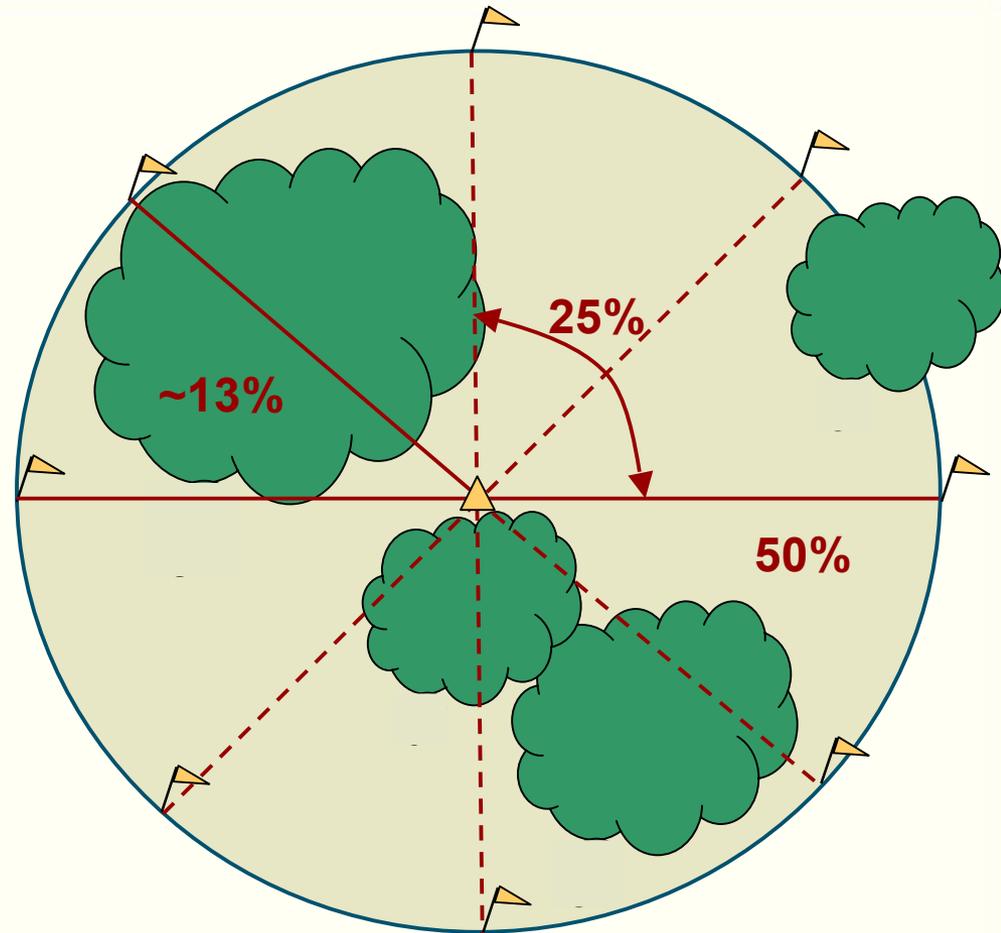
-  Flag
-  Stake
-  Plot Area

Tips for Estimating Cover

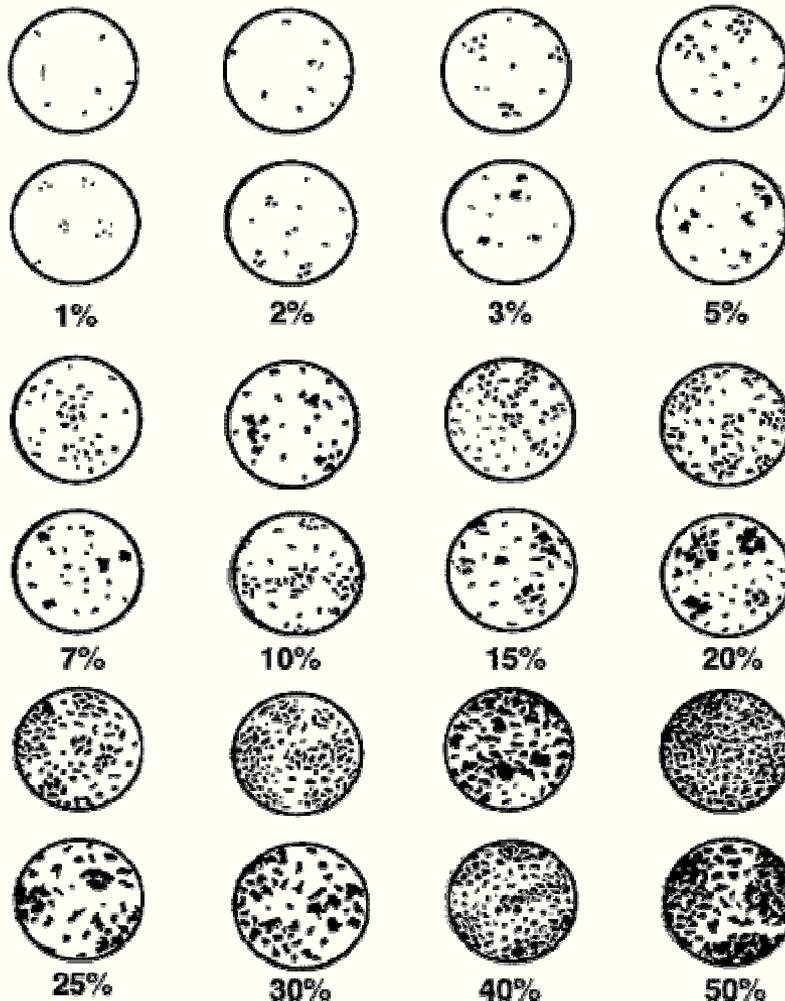
1. Record species that overhang the plot area even if the plant is not rooted in the plot.
2. Visually or using flagging tape, divide the circle into sections.
3. Area= 168m^2 or 1809ft^2
so $1\%= 2\text{ m}^2$ or 18 ft^2
with 1.5 m or 4.8 ft diameter

$10\%= 17\text{ m}^2$ or 181 ft^2
 $25\%= 42\text{ m}^2$ or 452 ft^2
 $50\%= 84\text{ m}^2$ or 905 ft^2

4. This measure is an estimate, so don't spend long periods of time trying to determine an exact measurement.

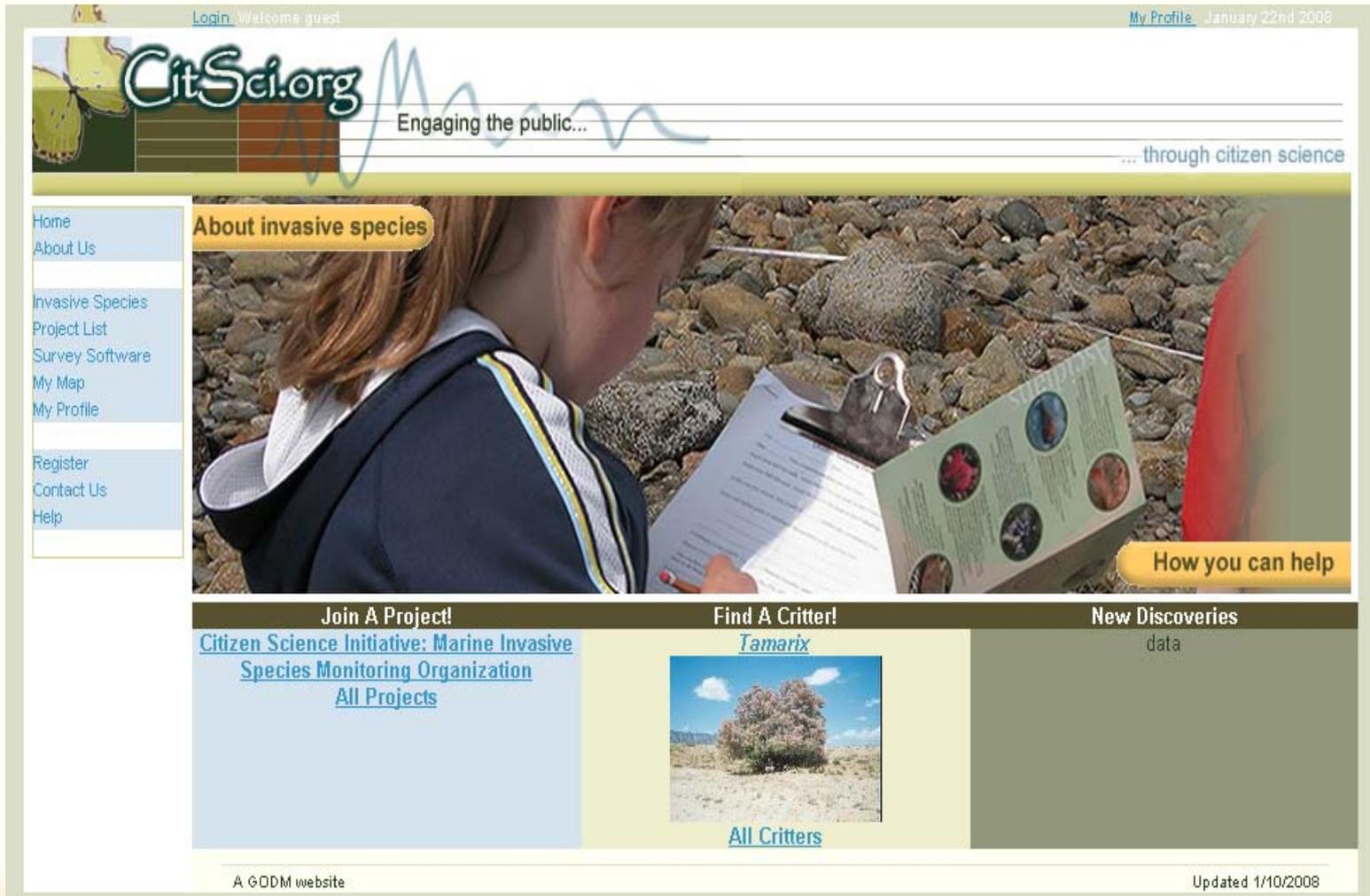


Tips for Estimating Cover



From B.C. Ministry of Environment, Lands, and Parks, B.C. Ministry of Forests. 1998.

What Do We Do With Our Data Following Collection?



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About invasive species

How you can help

Join A Project! Citizen Science Initiative: Marine Invasive Species Monitoring Organization All Projects	Find A Critter! <i>Tamarix</i>  All Critters	New Discoveries data
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A GODM website Updated 1/10/2008



Customize Data Entry Forms

- Name form
- Write instructions
- Choose geographic data
- Create species list
- Unique attributes for each species

Logout: Welcome Catherine My Profile: January 22nd 2008

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Edit an existing field form

[To Form List](#)

Field Form Information

Name:

Instructions:

Projection: Latitude / Longitude UTM

Volunteer Data: No Yes *Will data collected using this field form be collected by volunteers?*

Metadata: *Edit existing metadata for this field form*

Species:

- Species added will appear in the table below as you build your form
- A presence attribute will appear by default with each species added

Species & Attributes Displayed On This Field Form

Apis mellifera	honey bee	<input type="button" value="Add Attribute"/>	<input type="button" value="Change"/>	<input type="button" value="Delete"/>
	Presence		<input type="button" value="Change"/>	<input type="button" value="Delete"/>
	Weight		<input type="button" value="Change"/>	<input type="button" value="Delete"/>

A GDDM website Updated 2/16/2007

Customized Data Forms

Logout Welcome Catherine My Profile January 22nd 2008

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Honey Bee Project
[To Project Information](#)

Please fill in all the required fields

Enter the date of the observation

Date:

Notes:

Enter the location information

Datum:

Longitude¹:

Latitude²:

Accuracy³ (meters):

Field Form

Apis mellifera (honey bee)

Presence Present Absent

Weight

Honey Bee Project
[To Project Information](#)

Please fill in all the required fields

Enter the date of the observation

Date:

Notes:

Enter the location information

Datum: WGS_84 NAD_27 NAD_83

Longitude¹:

Latitude²:

Accuracy³ (meters):

Field Form

Apis mellifera (honey bee)

Presence Present Absent

Weight

- Download to PDA for automatic upload
- Hardcopy data collection from print version (left)
- On-line version for data entry (above)



Training Groups

- 5 in Year 1
 - Environmental Learning for Kids
 - Tamarisk Coalition
 - Invasive Tracers
 - Colorado State Forest Service
 - Several local school programs
- 10 in Year 2
 - Testing of data quality using monitoring protocol
 - Comparing citizen science to professionals



For more information contact:

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